

東北大学 電気通信研究所
研究室外部評価 参考資料
(2013 年度-2018 年度)

**Research Laboratory Reference Data
for External Review**

April 2013 – March 2019
(FY. 2013–2018)

**Research Institute of Electrical Communication
Tohoku University**

スピントロニクス研究室

Spintronics

1. 研究成果 / Research Achievements

(1) 査読付学術論文 / Refereed journal papers

1. S. Ishikawa, H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno, "Magnetic properties of MgO-[Co/Pt] multilayers with a CoFeB insertion layer," *Journal of Applied Physics*, vol. 113 pp. 17C721(1)-(3), April 3, 2013
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3. J. Ishihara, M. Ono, Y. Ohno, and H. Ohno, "A strong anisotropy of spin dephasing time of quasi-one-dimensional electron gas in modulation-doped GaAs/AlGaAs wires," *Applied Physics Letters*, vol. 102, pp. 212402(1)-(4), May 28, 2013
4. T. Ohsawa, H. Koike, S. Miura, H. Honjo, K. Kinoshita, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh, "A 1 Mb nonvolatile embedded memory using 4T2MTJ cell with 32 b fine-grained power gating scheme," *IEEE Journal of Solid-State Circuits*, vol. 48, No. 6, pp. 1511-1520, June 22, 2013
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9. L. Chen, F. Matsukura, and H. Ohno, "Direct-current voltages in (Ga,Mn)As structures induced by ferromagnetic resonance," *Nature Communications*, vol. 4, 3055, pp1-6, June 20, 2013
10. H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno, "MgO/CoFeB/Ta/CoFeB/MgO recording structure in magnetic tunnel junctions with perpendicular easy axis," *IEEE Transactions on Magnetics*, vol. 49, No. 7, pp. 4437-4440, July 7, 2013
11. S. Fukami, H. Sato, M. Yamanouchi, S. Ikeda, and H. Ohno, "CoNi films with perpendicular magnetic anisotropy prepared by alternate monoatomic layer

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10. H. Ohno, "Two and three terminal non-volatile spintronics devices for VLSI application," (invited),
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23. T. Ohsawa, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh,
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International Conference on Solid State Devices and Materials (SSDM), Fukuoka, Japan, September 24-27, 2013
27. H. Ohno,
“Spintronics Devices for Nonvolatile CMOS VLSIs,” (invited),
150 years diplomatic relation Japan-Switzerland, Swiss-Japanese Nanoscience Workshop, Materials Phenomena at Small Scale, Tsukuba, Japan, October 9-11, 2013
28. S. Fukami, H. Ohno,
“Current-induced magnetic domain wall motion in Co/Ni wire and its application to nonvolatile memory devices,” (invited),
150 years diplomatic relation Japan-Switzerland, Swiss-Japanese Nanoscience Workshop, Materials Phenomena at Small Scale, Tsukuba, Japan, October 9-11, 2013
29. H. Ohno,
“Material Status and Outlook of STT-Based Memory Technology,” (invited),
58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
30. S. Fukami, M. Yamanouchi, K. J. Kim, T. Koyama, D. Chiba, S. Ikeda, N. Kasai, T. Ono, H. Ohno
“Distribution of critical current density for magnetic domain wall motion,” (oral),
58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
31. C. Zhang, M. Yamanouchi, H. Sato, S. Fukami, S. Ikeda, F. Matsukura, and H. Ohno,
“Magnetization reversal induced by in-plane current in Ta/CoFeB/MgO structures with perpendicular magnetic easy axis,” (oral),
58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013

32. S. Ishikawa, H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno, "Co/Pt multilayer-based magnetic tunnel junctions with thin Ta spacer layer," (oral), 58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
33. H. Sato, Y. Takeuchi, K. Mizunuma, S. Ishikawa, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno, "Temperature dependence of thermal stability factor of CoFeB-MgO magnetic tunnel junctions with perpendicular easy-axis," (oral), 58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
34. K. Kinoshita, H. Honjo, K. Tokutome, S. Miura, M. Murahata, K. Mizunuma, H. Sato, S. Fukami, S. Ikeda, N. Kasai, and H. Ohno, "Process induced damage by C-O based etching chemistries and its recovery for a CoFeB-MgO magnetic tunnel junction with perpendicular magnetic easy-axis," (poster), 58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
35. D. Suzuki, M. Natsui, A. Mochizuki, S. Miura, H. Honjo, K. Kinoshita, H. Sato, S. Fukami, S. Ikeda, T. Endoh, H. Ohno, and T. Hanyu, "Fabrication of a perpendicular-MTJ-Based compact nonvolatile programmable switch using shared-write-control-transistor structure," (oral), 58th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
36. H. Honjo, S. Fukami, K. Ishihara, R. Nebashi, K. Kinoshita, K. Tokutome, M. Murahata, S. Miura, N. Sakimura, T. Sugibayashi, N. Kasai, and H. Ohno, "Three-terminal magnetic tunneling junction device with perpendicular anisotropy CoFeB sensing layer," (oral), 8th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
37. N. Sakimura, R. Nebashi, M. Natsui, T. Hanyu, H. Ohno, and T. Sugibayashi, "Analysis of single-event upset in MTJ/MOS-Hybrid circuits employing calculation of switching probability by radiation-induced current," (oral), 8th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
38. H. Koike, T. Ohsawa, S. Miura, H. Honjo, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh, "MTJ resistance distribution of 1-kbit 1T-1MTJ STT-MRAM cell arrays fabricated on a 300-mm wafer," (oral), 8th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
39. T. Ohsawa, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh, "Trend of TMR and variation in V_{th} for keeping data load robustness of MOS/MTJ hybrid latches," (poster), 8th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013
40. K. Kim, R. Hiramatsu, T. Koyama, K. Ueda, Y. Yoshimura, D. Chiba, K. Kobayashi, Y. Nakatani, S. Fukami, M. Yamanouchi, H. Ohno, H. Kohno, G. Tatara, and T. Ono, "Two-barrier stability in current-induced domain-wall motion device," (poster), 8th Magnetism and Magnetic Materials (MMM) Denver, Colorado, U. S. A., November 4-8, 2013

41. H. Ohno,
 “CoFeB-MgO Perpendicular Magnetic Tunnel Junction: Status & Prospects,”
 2nd STT-MRAM Global Innovation Forum (Tokyo, Japan, November 20, 2013)

42. S. Fukami and H. Ohno,
 “Three-terminal magnetic domain wall motion device for spintronics VLSIs,” (invited),
 International Japanese-French Workshop on Spintronics, Orsey, France, November 27-28,
 2013

43. F. Matsukura,
 “Ferromagnetic semiconductors: carrier induced ferromagnetism and electric-field effects,”
 (invited),
 Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-18), Osaka,
 Japan, December 9-10, 2013

44. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
 “Magnetic property of Li codoped (Ga,Mn)As,” (poster),
 Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-18), Osaka,
 Japan, December 9-10, 2013

45. A. Okada, S. Kanai, M. Yamanouchi, S. Ikeda, F. Matsukura, and H. Ohno,
 “Temperature dependence of electric-field effects on magnetic anisotropies in
 Ta-CoFeB-MgO,” (poster),
 Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-18), Osaka,
 Japan, December 9-10, 2013

46. S. Fukami, H. Sato, M. Yamanouchi, S. Ikeda, F. Matsukura, and H. Ohno,
 “Advances in spintronics devices for microelectronics –from spin-transfer torque,” (invited),
 19th Asia and South Pacific Design Automation Conference (ASP-DAC), Singapore, January
 20-23, 2014

47. H. Ohno,
 “Nanoscale magnetic tunnel junction”, (invited),
 American Physical Society, March Meeting, Denver, U. S. A., March 3-7, 2014

48. H. Ohno,
 “Spintronics: Materials through devices to integrated circuits,” (invited)
 International Meeting on Spintronics for Integrated Circuits Applications and Beyond, Tokyo,
 Japan, March 13, 2014

49. H. Honjo, S. Fukami, K. Ishihara, K. Kinoshita, A. Morioka, R. Nebashi, K. Tokutome, N.
 Sakimura, Y. Tsuji, S. Miura, T. Sugibayashi, N. Kasai, and H. Ohno,
 “Material stack design with high tolerance to process induced damage in domain wall motion
 device,” (oral),
 IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014

50. J. Kim, J. Sinha, S. Mitani, M. Hayashi, S. Takahashi, S. Maekawa, M. Yamanouchi, and H.
 Ohno,
 “Temperature dependence of current induced spin-orbit torques,” (oral),
 IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014

51. S. Fukami, M. Yamanouchi, S. Ikeda, and H. Ohno,
 “Thermal stability and critical current for domain wall motion in nanowires with reduced
 dimensions,” (invited),
 IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014

52. J. Torrejon, J. Kim, J. Sinha, S. Mitani, M. Hayashi, M. Yamanouchi, and H. Ohno,
 “Control of domain wall chirality in ultrathin CoFeB/MgO heterostructures by using different heavy metal underlayers,” (oral),
 IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014
53. N. Sakimura, R. Nebashi, H. Honjo, S. Fukami, Y. Tsuji, A. Morioka, N. Kasai, H. Ohno, T. Hanyu, T. Sugibayashi,
 “Three-terminal spintronics cells for high-speed and nonvolatile VLSIs,” (invited),
 IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014
54. S. Ikeda, H. Sato, E. C. I. Enobio, Y. Horikawa, S. Ishikawa, M. Yamanouchi, S. Fukami, S. Kanai, F. Matsukura, T. Endoh and H. Ohno,
 “Magnetic tunnel junctions with (Co)FeB-MgO double-interface recording structure for nonvolatile VLSIs,” (invited),
 2014 Spintronics Workshop on LSI, Hawaii, U. S. A., June 13, 2014
55. H. Ohno,
 “Current status and prospects of magnetoresistive random access memory technology,”
 (invited),
 6th Forum on New Materials (CIMTEC 2014), Montecatini, Italy, June 15-19, 2014
56. S. Fukami and H. Ohno,
 “Current induced domain wall motion in Co/Ni wires for nonvolatile memories and logic circuits,” (invited),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
57. M. Hayashi, J. Torrejon, J. Kim, J. Sinha, S. Mitani, S. Takahashi, S. Maekawa, M. Yamanouchi, and H. Ohno,
 “Current induced spin orbit torques and chiral magnetic texture in magnetic heterostructures,”
 (invited),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
58. L. Chen, F. Matsukura, T. Dietl, and H. Ohno,
 “Electrical detection and control of magnetization dynamics in (Ga,Mn)As,” (invited)
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
59. S. Kanai, Y. Nakatani, M. Yamanouchi, S. Ikeda, H. Sato, F. Matsukura, and H. Ohno,
 “Magnetization switching induced by electric field,” (invited),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
60. C. Zhang, M. Yamanouchi, H. Sato, S. Fukami, S. Ikeda, F. Matsukura, and H. Ohno,
 “In-plane current-induced effective fields and magnetization switching in Ta/CoFeB/MgO structures,” (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
61. S. DuttaGupta, S. Fukami, M. Yamanouchi, C. Zhang, H. Sato, S. Ikeda, F. Matsukura, and H. Ohno,
 “Current and field induced domain wall creep in Ta/CoFeB/MgO wire,” (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
62. Y. Takeuchi, S. Ishikawa, H. Sato, S. Ikeda, M. Yamanouchi, S. Fukami, F. Matsukura, and H. Ohno,
 “Temperature dependence of thermal stability factor in CoFeB-MgO magnetic tunnel junction,” (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014

63. Y. Horikawa, S. Ishikawa, S. Ikeda, H. Sato, S. Fukami, M. Yamanouchi, F. Matsukura, and H. Ohno,
 “MgO cap thickness dependence of interfacial anisotropy of MgO/FeB/MgO structure,”
 (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
64. S. Ishikawa, H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno,
 “High thermal stability of magnetic tunnel junction with CoFeB/Ta/[Co/Pt] multilayer
 ferromagnetic electrode,” (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
65. E. Hirayama, S. Kanai, K. Sato, M. Yamanouchi, H. Sato, S. Ikeda, F. Matsukura, and H.
 Ohno,
 “In-plane anisotropy in CoFeB magnetic tunnel junction”, (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
66. S. D’Ambrosio, L. Chen, H. Nakayama, F. Matsukura, T. Dietl, and H. Ohno,
 “dc voltage measured in Py/ZnO bilayer under ferromagnetic resonance,” (poster),
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
67. H. Sato,
 “Switching probability of spintronics devices”, (oral),
 10th American Institute of Mathematical Sciences Conference on Dynamical Systems,
 Differential Equations and Applications (AMIS14), Madrid, Spain, July 7-11, 2014
68. H. Ohno,
 “Spintronics for nonvolatile VLSIs”, (invited),
 Tsukuba Nanotechnology Symposium (TNS’14), Tsukuba, Japan, July 25-26, 2014
69. S. Fukami, C. Zhang, and H. Ohno,
 “Magnetic domain wall motion and spin-orbit torque induced magnetization switching for
 three-terminal spintronics devices,” (Invited),
 IEEE International Nanoelectronics Conference (INEC), Sapporo, Japan, July 28-31, 2014
70. H. Ohno,
 “Spintronics for VLSI,” (invited),
 8th International Conference on the Physics and Applications of Spin Phenomena in Solids
 (PASPS 8), Washington D.C., U. S. A., July 28-31, 2014
71. S. Kanai,
 “Magnetization switching in a CoFeB/MgO magnetic tunnel junction by the application of
 two successive voltage pulses,” (oral),
 8th International Conference on the Physics and Applications of Spin Phenomena in Solids
 (PASPS 8), Washington D.C., U. S. A., July 28-31, 2014
72. H. Ohno,
 “From compound semiconductors to spintronics,” (invited)
 Lester Eastman Conference on High Performance Devices, Ithaca, U. S. A., August 5-7, 2014
73. L. Chen, F. Matsukura, T. Dietl, and H. Ohno,
 “The effect of electric-field on damping constant of ferromagnetic semiconductor (Ga,Mn)As,”
 (oral),
 32nd International Conference on the Physics of Semiconductors (ICPS), Austin, U. S. A.,
 August 10-15, 2014

74. H. Ohno,
“Properties of CoFeB-MgO magnetic tunnel junctions down to 11nm”, (Keynote),
SPIE NanoScience +Engineering, San Diego, U. S. A., August 19-21, 2014
75. H. Ohno,
“Thermal stability and threshold current of nanoscale magnetic tunnel junctions,” (invited),
International Workshop on Nanomaterials (M-SNOWS), Nancy, France, September 8-11,
2014
76. E. Hirayama, S. Kanai, K. Sato, M. Yamanouchi, H. Sato, S. Ikeda, F. Matsukura, and H. Ohno,
“In-Plane Anisotropy of a CoFeB-MgO Magnetic Tunnel Junction with Perpendicular
Magnetic Easy Axis,” (poster),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
77. K. Watanabe, S. Ishikawa, H. Sato, S. Ikeda, M. Yamanouchi, S. Fukami, F. Matsukura, and H. Ohno,
“Dependence of Magnetic Properties of MgO/CoFeB/Ta Stacks on CoFeB and Ta
Thicknesses,” (poster),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
78. S. Miura, H. Honjo, K. Kinoshita, K. Tokutome, H. Koike, S. Ikeda, T. Endoh and H. Ohno,
“Properties of Perpendicular-Anisotropy Magnetic Tunnel Junctions Fabricated over The Cu
Via,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
79. H. Koike, T. Ohsawa, S. Miura, H. Honjo, K. Kinoshita, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh,
“A Power-Gated 32bit MPU with a Power Controller Circuit Activated by Deep-Sleep-Mode
Instruction Achieving Ultra-Low-Power Operation,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
80. H. Sato, T. Yamamoto, E. C. I. Enobio, M. Yamanouchi, S. Ikeda, S. Fukami, K. Kinoshita, F. Matsukura, N. Kasai, and H. Ohno,
“Switching Current and Thermal Stability of Perpendicular Magnetic Tunnel Junction with
MgO/CoFeB/Ta/CoFeB/MgO Recording Structure Scaling Down to IX nm,” (invited),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
81. T. Ohsawa, S. Miura, H. Honjo, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh,
“A 500ps/8.5ns Array Read/Write Latency 1MB Twin ITIMTJ STT-MRAM designed in 90
nm CMOS/40 nm MTJ Process with Novel Positive Feedback S/A Circuit,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan,
September 8-10, 2014
82. H. Ohno,
“Spintronic Nano-Devices for Nonvolatile VLSIs,” (invited),
1st University of Chicago/AIMR Joint Research Center Workshop, Sendai, Japan, September
18-19, 2014

83. S. Fukami, S. DuttaGupta, C. Zhang, and H. Ohno,
 “Three-Terminal Spintronics Devices for Nonvolatile Memory and Logic,” (invited),
 11th International Conference on Flow Dynamics (ICFD), Sendai, Japan, October 8-10, 2014

84. H. Ohno,
 “Spintronics – recent advances,” (invited),
 4th imec-Stanford International Workshop on Resistive Memories,” Stanford, U. S. A.,
 October 27-28, 2014

85. S. Fukami, C. Zhang, and H. Ohno,
 “Three-Terminal Nonvolatile Spintronics Memory Device using Spin-Transfer Torque and
 Spin-Orbit Torque,” (invited),
 14th Non-Volatile Memory Technology Symposium (NVMTS 2014), Jeju, Korea, October
 27-29, 2014

86. S. DuttaGupta, S. Fukami, M. Yamanouchi, H. Sato, F. Matsukura, and H. Ohno,
 “Domain wall creep in Ta/CoFeB/MgO wire induced by current field,” (oral),
 59th Annual Magnetism and Magnetic Materials Conference (MMM), Honolulu, Hawaii, U. S.
 A., November 3-7, 2014

87. E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
 “In-plane magnetic field angle dependence of ferromagnetic resonance frequency in a
 nanoscale CoFeB-MgO magnetic tunnel junction,” (oral),
 59th Annual Magnetism and Magnetic Materials Conference (MMM), Honolulu, Hawaii, U. S.
 A., November 3-7, 2014

88. C. Zhang, S. Fukami, H. Sato, M. Yamanouchi, F. Matsukura, and H. Ohno,
 “Device size dependence of magnetization reversal by spin-orbit torque in Ta/CoFeB/MgO
 structure down to sub 100 nm,” (oral),
 59th Annual Magnetism and Magnetic Materials Conference (MMM), Honolulu, Hawaii, U. S.
 A., November 3-7, 2014

89. H. Sato, E. C. I. Enobio, M. Yamanouchi, S. Ikeda, S. Fukami, S. Kanai, F. Matsukura, and H.
 Ohno,
 “Intrinsic critical current and thermal stability factor of MgO/CoFeB/Ta/CoFeB/MgO
 recording structure scaling down to 11 nm,” (oral),
 59th Annual Magnetism and Magnetic Materials Conference (MMM), Honolulu, Hawaii, U. S.
 A., November 3-7, 2014

90. H. Ohno,
 “Spintronics materials and devices for nonvolatile VLSIs,” (Plenary),
 1st International Symposium on Interactive Materials Science Cadet Program (iSIMSC),
 Osaka, Japan, November 16-19, 2014

91. H. Ohno,
 “Nano-scale magnetic tunnel junction for nonvolatile VLSIs,” (invited),
 2nd International Symposium on Functionality of Organized Nanostructures 2014 (FON14),
 Tokyo, Japan, November 26-28, 2014

92. H. Ohno,
 “Korea University Special Seminar,” (invited),
 Korea University Special Seminar, Seoul, Korea, Dec. 4, 2014

93. E. Hirayama, S. Kanai, H. Sato, F. Matsukura, H. Ohno,
 “Properties of Nanoscale Magnets Investigated by Homodyne-Detected Ferromagnetic
 Resonance,”

8th High-Tech Research Center Symposium, “New Frontiers in Functional Materials”, Toho University, Funabashi, Dec. 6, 2014

94. H. Ohno,
“Nanoscale Magnetic Tunnel Junction,” (invited),
Nanyang Technological University Seminar, Singapore, Dec. 18, 2014
95. H. Ohno and S. Fukami,
“Three-Terminal Spintronics Memory Devices with Perpendicular Anisotropy,” (invited),
International Magnetic Conference (INTERMAG), Beijing, China, May 11-15, 2015
96. S. Fukami, T. Anekawa, C. Zhang, and H. Ohno,
“Proposal and Demonstration of a New Spin-Orbit Torque Induced Switching Device,” (oral),
International Magnetic Conference (INTERMAG), Beijing, China, May 11-15, 2015
97. S. Sato, H. Honjo, S. Ikeda, H. Ohno, T. Endoh, and M. Niwa,
“Diffusion Behaviors Observed on the Surface of CoFeB Film after the Natural Oxidation and the Annealing,” (poster),
International Magnetic Conference (INTERMAG), Beijing, China, May 11-15, 2015
98. H. Ohno,
“Nanoscale Magnetic Tunnel Junction –Materials Science and Device Physics-,” (invited),
Intel Seminar, Beaverton, U. S. A., May 19, 2015
99. H. Ohno,
“Spintronic Nano-Devices for Nonvolatile VLSIs”, (invited),
Frontiers in Quantum Materials and Devices Workshop and Tohoku-Harvard Workshop,
Cambridge, U. S. A., May 21-22, 2015
100. H. Ohno,
“Nanoscale Magnetic Tunnel Junction”, (invited)
5th STT-MRAM Global Innovation Forum, Tokyo, Japan, May 27, 2015
101. H. Ohno,
“Nano-Scale Magnetic Tunnel Junction Materials and Devices –Toward Nonvolatile VLSI-,”
(invited),
International Conference on Spin Physics, Spin Chemistry and Spin Technology, Saint
Petersburg, Russia, June 1-5, 2015
102. H. Ohno,
“Nanoscale Magnetic Tunnel Junction,” (invited),
York-Tohoku-Kaiserslautern Symposium on New-Concept Spintronics Devices, York, UK,
June 11-13, 2015
103. F. Matsukura,
“DC Voltage in Pt/(Ga,Mn)As Under Ferromagnetic Resonance,” (invited),
York-Tohoku-Kaiserslautern Symposium on New-Concept Spintronics Devices, York, UK,
June 11-13, 2015
104. S. DuttaGupta,
“Domain Wall Creep Driven by Adiabatic Spin Transfer Torque in Magnetic Metals,” (poster),
York-Tohoku-Kaiserslautern Symposium on New-Concept Spintronics Devices, York, UK,
June 11-13, 2015

105. H. Sato, Y. Takeuchi, N. Ohshima, S. Kubota, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno,
“Properties of CoFeB-MgO Magnetic Tunnel Junctions with Perpendicular Easy Axis for Spintronics Based VLSI Applications,” (invited),
2015 Spintronics Workshop on VLSI, Kyoto, Japan, June 15, 2015
106. H. Ohno,
“Toward Ultra-Low Power Microprocessor Using Spintronics Technology,” (oral),
1st ImpACT International Symposium on Spintronic Memory, Circuit and Storage, Tokyo, Japan, June 21-22, 2015
107. H. Sato,
“CoFeB-MgO Magnetic Tunnel Junctions with Perpendicular Easy Axis for Low Power Consumption Spintronics based VLSIs,” (poster),
1st ImpACT International Symposium on Spintronic Memory, Circuit and Storage, Tokyo, Japan, June 21-22, 2015
108. H. Ohno,
“Spintronics for Stand-by Power Free VLSI,” (Plenary),
8th International Conference on Materials for Advanced Technologies and 16th IUMRS International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3, 2015
109. H. Ohno,
“Nanoscale Spintronics Materials and Devices,” (invited),
8th International Conference on Materials for Advanced Technologies and 16th IUMRS International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3, 2015
110. A. Okada, Y. Hashimoto, S. Kanai, F. Matsukura, and H. Ohno,
“Electric-Field Dependence of Magnetic Anisotropy and Damping Constant in Ta/CoFeB/MgO Structures,” (oral),
8th International Conference on Materials for Advanced Technologies and 16th IUMRS International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3, 2015
111. E. C. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Vector Network Analyzer –Ferromagnetic Resonance Measurements on CoFeB-MgO Stack with Perpendicular Easy Axis,” (oral),
8th International Conference on Materials for Advanced Technologies and 16th IUMRS International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3, 2015
112. M. Pohlit, F. Porrati, M. Huth, Y. Ohno, H. Ohno, and J. Muller,
“Building Blocks of Artificial Square Spin Ice: Stray-Field Studies of Thermal Dynamics and Tuned Interactions”, (oral),
20th International Conference on Magnetism (ICM), Barcelona, Spain, July 5-10, 2015
113. T. Le, A. Eklund, S. Chung, H. Mazraati, A. Nguyen, M. Yamanouchi, E. Enobio, S. Ikeda, H. Ohno, and J. Akerman,
“Ultra-High Frequency Tunability in Low-Current and Low-Field Spin Torque Oscillators based on Perpendicular Magnetic Tunnel Junctions”, (poster),
20th International Conference on Magnetism (ICM), Barcelona, Spain, July 5-10, 2015

114. S. Fukami, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Spin-Orbit Torque Switching in a Ferromagnet / Antiferromagnet Bilayer System,” (oral),
 20th International Conference on Magnetism (ICM), Barcelona, Spain, July 5-10, 2015
115. C. Zhang, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
 “Spin-Orbit Torque Induced Magnetization Switching in Ta/CoFeB/MgO Heterostructure
 with a Diameter Down to 30 nm,” (oral),
 20th International Conference on Magnetism (ICM), Barcelona, Spain, July 5-10, 2015
116. T. Iwabuchi, S. Fukami, and H. Ohno,
 “Width Dependence of Threshold Current Density for Domain Wall Motion in Co/Ni Wire,”
 (oral),
 34th Electronic Materials Symposium (EMS), Katata, Japan, July 8-10, 2015
117. N. Ohshima, S. Kubota, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “Junction Size Dependence of Switching Current in CoFeB-MgO Magnetic Tunnel Junctions
 with Perpendicular Easy Axis,” (oral),
 34th Electronic Materials Symposium (EMS), Katata, Japan, July 8-10, 2015
118. Y. Takeuchi, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “Temperature Dependence of Intrinsic Critical Current of CoFeB-MgO Magnetic Tunnel
 Junctions with Perpendicular Easy Axis,” (oral),
 International Colloquium on Magnetic Films and Surfaces (ICMFS), Cracow, Poland, July
 12-17, 2015
119. H. Ohno,
 “Nano-Spintronics Devices for VLSI Integration,” (invited),
 Spin Dynamics in Nanostructures, Gordon Research Conference (GRC), Hong Kong, China,
 July 26-31, 2015
120. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
 “Effect of Li Codoping on In-Plane Uniaxial Magnetic Anisotropy in (Ga,Mn)As,” (oral),
 21st International Conference on Electronic Properties of Two-Dimensional Systems and 17th
 International Conference on Modulated Semiconductor Structures, (EP2DS-21/MSS-17),
 Sendai, Japan, July 26-31, 2015
121. S. Kanai, M. Gajek, D. C. Worledge, F. Matsukura, and H. Ohno,
 “dc-bias Dependence of Ferromagnetic Resonance Spectra of a CoFeB-MgO based Magnetic
 Tunnel Junction,” (poster),
 International School and Conference (SPINTECH VIII), Basel, Switzerland, August 10-13,
 2015
122. S. Fukami and H. Ohno,
 “Spin-Orbit Torque Induced Magnetization Switching for Three-Terminal Spintronics
 Devices,” (invited),
 2nd Spin Waves and Interactions, Greifswald, Germany, September 9-11, 2015
123. H. Ohno,
 “Spintronics Nano-Devices for Nonvolatile VLSIs,” (invited),
 12th Sweden-Japan QNANO Workshop, Hindas, Sweden, September 24-25, 2015
124. S. Sato, H. Honjo, S. Ikeda, H. Ohno, T. Endoh, and M. Niwa,
 “Optimization of CoFeB Capping Layer Thickness for Characterization of Leakage Spot in
 MgO Tunneling Barrier of Magnetic Tunnel Junction”, (oral),
 2015 International Conference on Solid State Devices and Materials (SSDM), Sapporo,
 September 27-30, 2015

125. Y. Ma, S. Miura, H. Honjo, S. Ikeda, T. Hanyu, H. Ohno, T. Shibata and T. Endoh,
 “A600- μ W Ultra-Low-Power Associative Processor for Image Pattern Recognition
 Employing Magnetic Tunnel Junction (MTJ) Based Nonvolatile Memories with Novel
 Intelligent Power-Gating (IPG) Scheme,” (oral),
 2015 International Conference on Solid State Devices and Materials (SSDM), Sapporo,
 September 27-30, 2015
126. S. Fukami, H. Sato, and H. Ohno,
 “Spintronics Memory Devices for Ultralow-Power and High-performance Integrated Circuits,”
 (invited),
 2015 International Conference on Solid State Devices and Materials (SSDM), Sapporo,
 September 27-30, 2015
127. H. Ohno,
 “Nonvolatile VLSI Made Possible by Spintronics”, (invited),
 4th Winton Symposium, Cambridge, U. K., September 28, 2015
128. H. Sato, E. C. I. Enobio, S. Fukami, F. Matsukura, and H. Ohno,
 “Properties of Perpendicular-Anisotropy Magnetic Tunnel Junctions with Single and Double
 CoFeB-MgO Interface,” (invited),
 6th Annual Conference on Magnetism, Nanyang Technological University, Singapore, October
 2, 2015
129. T. Hanyu, M. Natsui, D. Suzuki, A. Mochizuki, N. Onizawa, S. Ikeda, T. Endoh, and H. Ohno,
 “Challenge of MTJ-based Nonvolatile Logic-Memory Architecture for Ultra Low-Power and
 Highly Dependable VLSI Computing,” (invited),
 IEEE SOI-3D-Subthreshold Microelectronics Technology Unifield Conference, Rohnert Park,
 U. S. A., October 5-8, 2015
130. H. Ohno,
 “Spintronics Nano-Devices for Nonvolatile VLSIs,” (invited),
 Electronic and Photonics Workshop, University of California Santa Barbara, U. S. A., October
 15, 2015
131. E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “Improving the Sensitivity of Vector-Network-Analyzer Ferromagnetic Resonance
 Measurement by Varying the Coplanar Waveguide Size,” (invited),
 2015 International Conference on Applied Materials and Optical Systems (ICAMOS), Cavite
 State University, Philippines, October 22-24, 2015
132. H. Ohno,
 “Spintronics materials and devices for nonvolatile CMOS VLSIs”, (*Plenary*),
 16th RIES-Hokudai International Symposium, Sapporo, Japan, November 10-11, 2015
133. H. Sato, E. C. I. Enobio, N. Oshima, S. Fukami, F. Matsukura, and H. Ohno,
 “Perpendicular -anisotropy CoFeB-MgO magnetic tunnel junctions for low power
 consumption non-volatile VLSI,” (invited),
 3rd Tohoku University KTH Joint Workshop, KTH, Sweden, November 13, 2015.
134. S. Fukami, C. Zhang, S. DuttaGupta, A. Kurenkov, and H. Ohno,
 “Spin-Orbit Torque Switching for Three-Terminal Spintronics Devices,” (invited),
 13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015

135. S. DuttaGupta, S. Fukami, C. Zhang, H. Sato, M. Yamanouchi, F. Matsukura, and H. Ohno, “Different Universality Classes for Current and Field Driven Domain Wall Creep in a Magnetic Metal,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
136. K. Watanabe, H. Sato, S. Fukami, F. Matsukura, and H. Ohno, “Layer Thicknesses and Annealing Condition Dependence of Magnetic Properties of CoFeB-MgO Structure,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
137. S. Miyakozawa, L. Chan, F. Matsukura, and H. Ohno, “Temperature Dependence of Magnetotransport Properties in (Ga,Mn)As: Li,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
138. C. Zhang, S. Fukami, H. Sato, F. Matsukura, and H. Ohno, “Magnetization Switching via Spin-Orbit Torque in Nano-Scale Ta/CoFeB/MgO,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
139. T. Anekawa, C. Zhang, S. Fukami, and H. Ohno, “A Three-Terminal Spin-Orbit Torque Device with a New Configuration,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
140. A. Okada, Y. Hashimoto, S. Kanai, F. Matsukura, and H. Ohno, “Electrical Modulation of Damping Constant in Ta/CoFeB/MgO with Perpendicular Easy Axis,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
141. E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno, “CoFeB Thickness Dependence of Damping Constant for Single and Double CoFeB-MgO Interface Structures,” (poster),
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
142. Y. Nakatani, S. Kanai, S. Fukami, M. Hayashi and H. Ohno, “Control of the skyrmion structure in a nano disk by electric field pulses at room temperature,” (invited),
13th Joint MMM-Intermag Conference, San Diego, U. S. A., January 11-15, 2016
143. S. Ishikawa, H. Sato, S. Fukami, F. Matsukura, and H. Ohno, “Current induced magnetization switching of CoFeB/Ta/[Co/Pd(Pt)]-multilayer in magnetic tunnel junctions with perpendicular anisotropy,” (oral),
13th Joint MMM-Intermag Conference, San Diego, U. S. A., January 11-15, 2016
144. S. Kanai, Y. Nakatani, H. Sato, F. Matsukura, and H. Ohno, “Electric field control of magnetism and magnetization switching in CoFeB-MgO,” (invited),
13th Joint MMM-Intermag Conference, San Diego, U. S. A., January 11-15, 2016
145. H. Honjo, H. Sato, S. Ikeda, S. Sato, T. Watanabe, S. Miura, T. Natsuno, Y. Noguchi, M. Yasuhira, T. Tanigawa, H. Koike, M. Muraguchi, M. Niwa, K. Ito, H. Ohno, and T. Endoh, “Optimum boron composition difference between single and double CoFeB/MgO interface perpendicular magnetic tunnel junctions (MTJs) with high thermal tolerance and its mechanism,” (oral),
13th Joint MMM-Intermag Conference, San Diego, U. S. A., January 11-15, 2016

146. K. Watanabe, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “Dependence of magnetic properties of CoFeB-MgO on buffer layer materials”, (poster),
 13th Joint MMM-Intermag Conference, San Diego, U. S. A., January 11-15, 2016
147. H. Ohno,
 “Two-and three-terminal spintronics devices,” (invited),
 2nd CIES Technology Forum, Sendai, Japan, March 17, 2016
148. H. Ohno,
 “Efficiency of spintronics nanodevices,” (invited),
 Spintronics Meeting in Lanna, Prague, Czech, March 30-31, 2016
149. H. Ohno,
 “Spintronics nano-devices for VLSIs,” (*plenary*),
 5th International Conference on Superconductivity and Magnetism (ICSM), Fethiye, Turkey,
 April 24-30, 2016
150. S. Fukami,
 “Three-terminal spintronic devices for integrated circuits,” (invited),
 7th IEEE International Nanoelectronic Conference (IEEE INEC216), Chengdu, China, May
 9-11, 2016
151. H. Ohno,
 “Nano spintronics devices for CMOS integration,” (invited),
 5th International Conference Smart and Multifunctional Materials, Structures and Systems
 (CIMTEC), Perugia, Italy, June 5-9, 2016
152. H. Ohno,
 “Material Efficiency: The case of devices for IoT,” (invited),
 World Materials Forum, Nancy, France, June 9-10, 2016
153. S. Fukami, C. Zhang, S. DuttaGupta, A. Kurenkov, T. Anekawa, and H. Ohno,
 “Current status and future outlook of three-terminal spintronics devices,”
 2016 Spintronics Workshop on LSI, Honolulu, U. S. A., June 13, 2016
154. S. Fukami, C. Zhang, T. Anekawa, A. Ohkawara, S. DuttaGupta, A. Kurenkov, and H. Ohno,
 “Spin-orbit torque induced switching for high-speed and reliable memory devices,”
 3rd Workshop of the Core-to-core Project Tohoku-York-Kaiserslautern, New concepts for
 future spintronic devices, Kaiserslautern, Germany, June 22-24, 2016
155. S. Kanai, F. Matsukura, and H. Ohno,
 “How low energy the electric-field induced magnetization switching can be made? –A case of
 CoFeB/MgO/CoFeB magnetic tunnel junction,” (oral),
 3rd Workshop of the Core-to-core Project Tohoku-York-Kaiserslautern, New concepts for
 future spintronic devices, Kaiserslautern, Germany, June 22-24, 2016
156. H. Ohno,
 “Spin-orbit torque switching of magnetization,” (invited),
 University of Chicago IME Seminar, Chicago, USA, June 28, 2016
157. H. Ohno,
 “Spintronics nano-devices for VLSIs,” (invited),
 Northwestern University Materials Science and Engineering Seminar, Evanston, USA, June
 30, 2016

158. H. Ohno,
 “Three-Terminal Spintronics Devices for VLSI,” (invited),
 International Union of Materials Research Societies-International Conference on Electronic
 Materials (IUMRS-ICEM 2016), Singapore, July 4-8, 2016
159. H. Ohno,
 “Spintronics I”,
 IEEE Magnetic Society Summer School, Sendai, Japan, July 10-16, 2016
160. H. Ohno,
 “Spintronics II”,
 IEEE Magnetic Society Summer School, Sendai, Japan, July 10-16, 2016
161. S. Gupta,
 “Temperature dependence of ferromagnetic resonance of Py on $(\text{Bi}_{1-x}\text{Sb}_x)_2\text{Te}_3$ ” (poster),
 33rd International Conference on the Physics of Semiconductors, (ICPS), Beijing, China, July
 31-August 5, 2016
162. H. Ohno,
 “Three-Terminal Spintronics Devices for CMOS Integration,”
 The 4th International Conference of Asian Union of Magnetism Societies (ICAUMS 2016),
 Tainan, Taiwan, August 1-5, 2016
163. M. Bersweiler, K. Watanabe, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “High interfacial anisotropy and low Gilbert damping in MgO/Fe/Fe-V/Fe/MgO structure,”
 (poster),
 9th International Conference on Physics and Applications of Spin-Related Phenomena in
 Solids (PASPS9), Kobe, Japan, August 8-11, 2016
164. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
 “Damping constant of free layer in nanoscale magnetic tunnel junction,” (poster),
 9th International Conference on Physics and Applications of Spin-Related Phenomena in
 Solids (PASPS9), Kobe, Japan, August 8-11, 2016
165. T. Dohi, S. Kanai, A. Okada, F. Matsukura, and H. Ohno,
 “Electric-field modulation of stiffness constant in MgO/CoFeB/Ta observed through domain
 structures,” (poster),
 9th International Conference on Physics and Applications of Spin-Related Phenomena in
 Solids (PASPS9), Kobe, Japan, August 8-11, 2016
166. A. Kurenkov, C. Zhang, S. DuttaGupta, S. Fukami, and H. Ohno,
 “Field-free switching of antiferromagnet/ferromagnet dots by spin-orbit torque, (oral),
 9th International Conference on Physics and Applications of Spin-Related Phenomena in
 Solids (PASPS9), Kobe, Japan, August 8-11, 2016
167. H. Ohno,
 “Spintronics Nano-Devices for VLSI Integration,” (*Plenary*),
 8th Joint European Magnetism Symposium (JEMS2016), Glasgow, UK, August 21-26, 2016
168. C. Zhang,
 “Sputtering condition dependence of spin-orbit torque induced magnetization switching in
 W/CoFeB/MgO, (oral),
 8th Joint European Magnetism Symposium (JEMS2016), Glasgow, UK, August 21-26, 2016
169. H. Ohno,
 “Nanoscale Spintronics Devices,” (*Plenary*),

16th International Conference on Nanotechnology (IEEE NANO), Sendai, Japan, August 22-25, 2016

170. H. Ohno,
“Spintronics Nano-Devices for VLSIs Applications,” (*Plenary*),
20th Int. Vacuum Congress (IVC-20), Busan, Korea, August 21-26, 2016
171. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“Damping constant of nanoscale CoFeB determined from magnetic tunnel junction with orthogonal magnetization directions,” (poster),
2016 Tohoku University and University of York Joint Seminar: Prospect of Future Spintronics –from physics to devices - , Sendai, Japan, August 29-30, 2016
172. K. Watanabe, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
“Dependence of magnetic properties of CoFeB-MgO stacks on the buffer layer nature,” (poster),
2016 Tohoku University and University of York Joint Seminar: Prospect of Future Spintronics –from physics to devices - , Sendai, Japan, August 29-30, 2016
173. S. Fukami, C. Zhang, T. Anekawa, A. Ohkawra, S. DuttaGupta, A. Kurenkov, and H. Ohno,
“Three-terminal spin-orbit torque switching devices,” (invited),
SPIE Optics+Photonics, San Diego, U. S. A., August 28-September 1, 2016
174. H. Ohno,
“Spin-orbit switching of magnetization,”
2nd Marie Curie School on Domain Walls and Spintronics, Spetses, Greece, September 12-16, 2016
175. H. Ohno,
“Two-and three terminal spintronics devices for VLSI-progress in spin-orbit-torque devices,”
Nanomaterials 2016, International Workshop and School on Spin Transfer, Nancy, France, September 23-26, 2016
176. S. Fukami, A. Kurenkov, W. A. Borders, T. Kanemura, C. Zhang, S. DuttaGupta, and H. Ohno,
“Field-free spin-orbit torque induced switching in an antiferromagnet-ferromagnet bilayer system”, (invited),
SPICE Workshop on Antiferromagnetic Spintronics, Mainz, Germany, September 26-30, 2016
177. M. Natsui, A. Tamakoshi, T. Endoh, H. Ohno, T. Hanyu,
“Highly reliable MTJ-based nonvolatile logic-in-memory LSI with content-aware write error masking scheme,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan, September 26-29, 2016
178. Y. Ma, S. Miura, H. Honjo, S. Ikeda, T. Hanyu, H. Ohno and T. Endoh,
“A compact and ultra-low-power STT-MRAM-based associative memory for nearest neighbor search with full adaptivity of template data format employing current-mode similarity evaluation and time-domain minimum searching,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan, September 26-29, 2016
179. J. Igarashi, E. Enobio, J. Llandro, H. Sato, S. Fukami, F. Matsukura and H. Ohno,
“Magnetic field angle dependence of switching field in CoFeB-MgO magnetic tunnel junctions with perpendicular easy axis at low temperature,” (oral),
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan, September 26-29, 2016

180. H. Ohno,
 “Nanoscale two-and three terminal spintronics devices for VLSI,”
 2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba,
 Japan, September 30, 2016
181. S. Fukami and H. Ohno,
 “Nonvolatile spintronics devices for integrated-circuit applications,” (invited),
 MAINZ Summer School New Direction in Spintronics Research, Shanghai, China, October
 12, 2016
182. H. Ohno,
 “High-speed & external-magnetic-field free spin-orbit switching devices for VLSI,” (invited),
 8th MRAM Global Innovation Forum, Seoul, Korea, October 26, 2016
183. S. Fukami, A. Kurenkov, W. A. Borders, T. Kanemura, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Magnetization switching by spin-orbit torque in an antiferromagnet-ferromagnet bilayer
 system,” (invited),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
184. H. Honjo, S. Sato, S. Ikeda, H. Sato, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M.
 Yasuhira, T. Tanigawa, H. Koike, M. Muraguchi, M. Niwa, K. Ito, H. Ohno, and T. Endoh,
 “Origin of variation of shift field via annealing at 400°C in a perpendicular-anisotropy
 magnetic tunnel junction with [Co/Pt]-multilayers based synthetic ferromagnetic reference
 layer,” (oral),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
185. N. Ohshima, J. Llandro, H. Sato, S. Kanai, S. Fukami, F. Matsukura, and H. Ohno,
 “Electrical magnetization switching in CoFeB/MgO magnetic tunnel junctions in nanosecond
 regime,” (oral),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
186. S. DuttaGupta, S. Fukami, M. Yamanouchi, C. Zhang, H. Sato, F. Matsukura, and H. Ohno,
 “Adiabatic spin transfer torque induced domain wall creep in a magnetic metal”, (invited),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
187. E. Jackson, S. DuttaGupta, S. Fukami, H. Ohno and A. Hirohata,
 “Imaging defects in magnetic multilayers using scanning electron microscopy,” (oral),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
188. S. Gupta, S. Kanai, F. Matsukura, and H. Ohno,
 “Temperature dependence of ferromagnetic resonance spectra of Py deposited on
 (Bi_{1-x}Sb_x)₂Te₃,” (oral),
 61st Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, U. S.
 A., October 31-November 4, 2016
189. S. Ikeda, H. Honjo, H. Sato, K. Ito, M. Niwa, H. Ohno, and T. Endoh,
 “Material design in developing advanced CoFeB-MgO magnetic tunnel junctions for
 nonvolatile VLSI,”

190. S. Fukami,
“Spin-orbit torque switching for integrated circuit –from sub-ns memory to artificial intelligence,” (invited),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
191. S. Kanai,
“Thermal agitation and speed of switching in electric-field induced magnetization reversal of CoFeB/MgO magnetic tunnel junctions,” (invited),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
192. A. Okada, Y. Hashimoto, S. Kanai, F. Matsukura, and H. Ohno,
“Electric-field modulation of damping constant in Ta/CoFeB/MgO as a function of magnetic anisotropy,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
193. T. Dohi, S. Kanai, F. Matsukura, and H. Ohno,
“Electric-field modulation of spin-wave resonance spectra in a nanoscale magnetic tunnel junction,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
194. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
“Temperature and magnetic field direction dependence of transport properties of (Ga,Mn)As codoped with Li,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
195. S. DuttaGupta, S. Fukami, B. Kuerbanjiang, H. Sato, F. Matsukura, V. K. Lazarov, and H. Ohno,
“Universality classes for domain wall creep motion in magnetic metal Ta/CoFeB/MgO,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
196. N. Ichikawa, T. Dohi, S. Kanai, A. Okada, F. Matsukura, and H. Ohno,
“CoFeB thickness dependence of exchange stiffness constants in Ta/CoFeB/MgO,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
197. M. Bersweiler, K. Watanabe, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Interfacial anisotropy and Gilbert damping in MgO/Fe/Fe-V/Fe/MgO structure,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
198. S. Ishikawa, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Current induced magnetization switching of magnetic tunnel junctions with Co-based recording layers,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
199. K. Watanabe, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
“Effect of buffer layer material and its crystal structure on magnetic properties of CoFeB/MgO stacks,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
200. N. Ohshima, H. Sato, S. Kanai, J. Llandro, S. Fukami, F. Matsukura, and H. Ohno,
“Electric-field effect on current-induced magnetization switching in a CoFeB/MgO magnetic

- tunnel junction,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
201. J. Y. Kim, A. Okada, S. Miyakozawa, S. Kanai, F. Matsukura, I. Farrer, H. E. Beere, D. A. Ritchie, H. Ohno, and A. Hirohata,
“Development of spin-polarised transistor,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
202. A. Kurenkov, C. Zhang, S. DuttaGupta, S. Fukami, and H. Ohno,
“Spin-orbit torque induced switching of antiferromagnet/ferromagnet dots with various sizes,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
203. C. Zhang, S. Fukami, K. Watanabe, A. Ohkawara, S. DuttaGupta, H. Sato, F. Matsukura, and H. Ohno,
“Spin-orbit torque induced magnetization switching in nanoscale W/CoFeB/MgO-effect of sputtering condition of W,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
204. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“Homodyne-detected ferromagnetic resonance spectra of CoFeB with perpendicular easy axis under perpendicular magnetic fields,” (poster),
14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
205. A. Okada, S. He, B. Gu, S. Kanai, A. Soumyanarayanan, S. T. Lim, M. Tran, M. Mori, S. Maekawa, F. Matsukura, H. Ohno, and C. Panagopoulos,
“Temperature and thickness dependencies of ferromagnetic resonance spectra of MgO/CoFeB/MgO,” (oral),
Tohoku/York/ Kaiserslautern 4th JSPS Core-to-core Workshop on “New-Concept Spintronics Devices,” Sendai, Japan, November 19-20, 2016
206. Y. Nakatani, M. Hayashi, S. Kanai, S. Fukami, and H. Ohno,
“Electric field control of Skyrmions in magnetic nanodisks,” (oral),
Tohoku/York/ Kaiserslautern 4th JSPS Core-to-core Workshop on “New-Concept Spintronics Devices,” Sendai, Japan, November 19-20, 2016
207. S. Gupta, S. Kanai, F. Matsukura, and H. Ohno,
“Temperature dependent spin pumping in Py/(Bi_{1-x}Sb_x)²,” (oral),
MRS Fall Meeting, Boston, U. S. A., November 27-December 2, 2016
208. S. Honjo, S. Ikeda, H. Sato, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M. Yasuhira, T. Tanigawa, H. Koike, M. Muraguchi, M. Niwa, K. Ito, H. Ohno, and T. Endoh,
“Thermally robust double CoFeB-MgO interface magnetic tunnel junction with perpendicular easy axis,” (poster),
IEEE International Electron Devices Meeting (IEDM), San Francisco, USA, December 3-7, 2016
209. H. Honjo, S. Ikeda, H. Sato, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M. Yasuhira, T. Tanigawa, H. Koike, M. Muraguchi, M. Niwa, K. Ito, H. Ohno, and T. Endoh,
“High thermal tolerance synthetic ferromagnetic reference layer with developed buffer layer for perpendicular anisotropy magnetic tunnel junctions,” (poster),
IEEE International Electron Devices Meeting (IEDM), San Francisco, USA, December 3-7, 2016
210. J. Igarashi, E. C. I Enobio, J. Llandro, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Magnetic field angle dependence of switching field in perpendicular-anisotropy

- CoFeB-MgO magnetic tunnel junctions at various temperatures,” (poster),
International School on Spintronics and Spin-Orbitronics, Fukuoka, Japan, December 16-17,
2016
211. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“Junction size dependence of damping constants of CoFeB in magnetic tunnel junctions,”
(poster),
International School on Spintronics and Spin-Orbitronics, Fukuoka, Japan, December 16-17,
2016
212. T. Dohi, S. Kanai, F. Matsukura, and H. Ohno,
“Electric-field effect on spin-wave resonance in a nanoscale magnetic tunnel junction,”
(poster),
International School on Spintronics and Spin-Orbitronics, Fukuoka, Japan, December 16-17,
2016
213. N. Ichikawa, T. Dohi, S. Kanai, A. Okada, F. Matsukura, and H. Ohno,
“CoFeB thickness dependence of domain structures in Ta/CoFeB/MgO,” (poster),
International School on Spintronics and Spin-Orbitronics, Fukuoka, Japan, December 16-17,
2016
214. H. Ohno,
“Spin on Integrated Circuits: An Emerging Field of Spintronics,” (invited),
Conference on 90 Years of Quantum Mechanics, Singapore, January 23-26, 2017
215. H. Ohno,
“Nano Spintronics Devices for Integrated Circuit Applications,” (*Plenary*),
International Conference on Magnetic Materials and Applications (ICMAGMA-2017),
Hyderabad, India, February 1-3, 2017
216. H. Ohno,
“Nano Spintronics Devices –From Digital to Bio-inspired Computing-,” (*Plenary*),
International Symposium for Bio-Convergence Spin System, Daegu, Korea, February 9-11,
2017
217. S. Gupta, S. Kanai, F. Matsukura, and H. Ohno,
“Temperature dependence of ferromagnetic resonance spectra of Py deposited on
(Bi_{1-x}Sb_x)₂Te₃,” (poster),
International Conference on Magnetic Materials and Applications (IOCMAGMA-2017),
Hyderabad, India, February 1-3, 2017
218. J. Llandro,
“Magnetic gyroids; topological effects via 3D nanostructuring,” (invited),
Regensburg-Tohoku Workshop on Solid-State Physics and Spintronics, Sendai, Japan, March
28-30, 2017
219. T. Dohi,
“Spin-wave resonance and its electric-field modulation in nanoscale CoFeB/MgO magnetic
tunnel junctions,” (poster),
Regensburg-Tohoku Workshop on Solid-State Physics and Spintronics, Sendai, Japan, March
28-30, 2017
220. M. Shinozaki,
“Homodyne-detected ferromagnetic resonance in nanoscale magnetic tunnel junction under
perpendicular magnetic fields,” (poster),

221. A. Kurenkov, S. DuttaGupta, C. Zhang, W. A. Borders, S. Fukami, and H. Ohno, "Spin-orbit torque memristive memory operated by pulses down to 1 ns," (oral), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
222. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno, "Switching of Co/Pt multilayer structures by spin-orbit torque," (oral), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
223. W. A. Borders, H. Akima, S. Fukami, S. Moriya, S. Kurihara, A. Kurenkov, Y. Horio, S. Sato, and H. Ohno, "An Artificial Neural Network with an Analogue Spin-Orbit Torque Devices," (oral), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
224. S. DuttaGupta, C. Zhang, S. Fukami, and H. Ohno, "Evaluation of Dzyaloshinskii-Moriya interaction from thermally activated and flow regime domain wall motion," (oral), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
225. A. Hirohata, E. Jackson, Y. Yamamoto, B. Murphy, A. Vick, S. DuttaGupta, S. Fukami, H. Ohno, T. Kubota, and Takanashi, "Imaging and Analysis of Buried Defects at Interfaces," (invited), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
226. M. Bersweiler, H. Sato, S. Fukami, F. Matsukura, and H. Ohno, "An interfacial anisotropy and Gilbert damping constant of double (Co)FeB-MgO interface structure of MgO/(Co)FeB/MgO," (poster), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
227. H. Honjo, H. Sato, S. Ikeda, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M. Yasuhira, T. Tanigawa, H. Koike, M. Muraguchi, M. Niwa, K. Ito, H. Ohno, and T. Endoh, "Impact of sputtering condition for tungsten on magnetic and transport properties of magnetic tunneling junction with CoFeB/W/CoFeB free layer," (poster), International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
228. S. Fukami and H. Ohno, "Spin-orbit torque induced magnetization switching and its applications," (invited), Workshop for the Recent Development in the Spintronics, Fukui, Japan, June 3, 2017
229. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno, "Magnetization switching of high magnetic-anisotropy Co/Pt multilayers induced by spin-orbit torque," (poster), International School and Conference (SpinTech IX), Fukuoka, Japan, June 4-8, 2017
230. T. Dohi, S. Kanai, F. Matsukura, and H. Ohno, "Electric-field effect on spin-wave resonance in nanoscale CoFeB/MgO magnetic tunnel junctions," (poster), International School and Conference (SpinTech IX), Fukuoka, Japan, June 4-8, 2017
231. H. Ohno, "Introduction to Spintronics Devices for VLSI," (invited), International School and Conference (SpinTech IX), Fukuoka, Japan, June 4-8, 2017

232. H. Ohno,
 “Analog spintronics memory,” (invited),
 York-Tohoku-Kaiserslautern Symposium on “New-Concept Spintronics Devices, York, UK,
 June 21-23, 2017
233. H. Ohno,
 “Three-terminal spintronics devices for CMOS integration,” (invited),
 75th Device Research Conference (DRC), University of Notre Dame, U. S. A., June 25-28,
 2017
234. T. Dohi, S. Kanai, F. Matsukura, and H. Ohno,
 “Electric-field modulation of exchange stiffness constant in CoFeB/MgO investigated by
 spin-wave resonance,” (oral),
 The European Conference Physics of Magnetism 2017 (PM’17), Poznan, Poland, June 26-30,
 2017
235. T. Dohi, S. Kanai, F. Matsukura, and H. Ohno,
 “Anisotropy and exchange stiffness in CoFeB,” (oral),
 York-Tohoku Summer School in Spintronics, York, UK, July 26-28, 2017
236. J. Igarashi, J. Llandro, H. Sato, and H. Ohno
 “Magnetic field angle dependence of coercivity in a nanoscale CoFeB/MgO magnetic tunnel
 junctions with perpendicular easy axis,” (oral),
 York-Tohoku Summer School in Spintronics, York, UK, July 26-28, 2017
237. M. Shinozaki, S. Kanai, H. Sato, F. Matsukura, and H. Ohno
 “Damping in perpendicular MTJs”, (oral),
 York-Tohoku Summer School in Spintronics, York, UK, July 26-28, 2017
238. J. Llandro,
 “Geometrical effects in magnetism,” (invited),
 York-Tohoku Summer School in Spintronics, York, UK, July 26-28, 2017
239. S. Gupta, S. Kanai, F. Matsukura, and H. Ohno,
 “Magnetic and transport properties of $(\text{Sb}_{1-x}\text{Cr}_x)_2\text{Te}_3$,” (poster),
 22 International Conference on Electronic Properties of Two Dimensional Systems and 18th
 International Conference on Modulated Semiconductor Structures (EP2DS-22/MSS-18), Penn
 State, U. S. A., July 31-August 4, 2017
240. S. Fukami, C. Zhang, A. Kurenkov, W. A. Borders, S. DuttaGupta, and H. Ohno,
 “Spin-orbit torque memory devices for integrated-circuit applications,” (invited),
 29th International Conference on Defects in Semiconductors, (ICDS), Matsue, Japan, July
 31-August 4, 2017
241. S. Fukami, C. Zhang, A. Kurenkov, W. A. Borders, S. DuttaGupta, and H. Ohno,
 “Spin-orbit torque switching devices for high-speed memories and artificial synapses,” (oral),
 28th Magnetic Recording Conference (TMRC), Tsukuba, Japan, August 2-4, 2017
242. S. Fukami, W. A. Borders, A. Kurenkov, H. Akima, S. Moriya, S. Kurihara, Y. Horio, S. Sato,
 and H. Ohno,
 “Analogue spin-orbit torque device for artificial-neural-network-based associative memory
 operation,” (invited),
 SPIE Optics+Photonics Nanoscience +Engineering, San Diego, U. S. A., August 6-10, 2017

243. H. Ohno,
 “Spintronics research at RIEC, past, present and future,” (invited),
 Tohoku-Hanyang Workshop on Electronics and Communications Engineering (WECE),
 Sendai, Japan, August 8, 2017
244. C. Zhang, S. Fukami, S. DuttaGupta, H. Sato, and H. Ohno,
 “Device size dependence of spin-orbit torque induced magnetization switching in
 W/CoFeB/MgO,” (oral),
 International Conference on Solid State Devices and Materials (SSDM), Sendai, Japan,
 September 19-22, 2017
245. E. C. I. Enobio, H. Sato, S. Fukami, and H. Ohno,
 “Evaluation of energy barrier of CoFeB/MgO magnetic tunnel junctions with perpendicular
 easy axis using retention time measurement,” (oral),
 International Conference on Solid State Devices and Materials (SSDM), Sendai, Japan,
 September 19-22, 2017
246. H. Ohno,
 “Spintronics nanodevices for low-power integrated circuits,” (invited),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
247. S. Fukami,
 “Spin-orbit torque switching for high-speed nonvolatile memory applications,” (invited),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
248. J. Courtin, S. Fukami, T. Anekawa, C. Zhang, H. Ohno, and T. Devolder,
 “Magnetization switching in in-plane magnetized SOT-MRAM devices,” (poster),
 Louis Neel Colloquium, Paris, France, September 24-27, 2017
249. M. Bersweiler, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
 “Impact de la concentration en atome de Co sur les proprietes magnetiques au sein de
 junction magnetique tunnel MgO/CoFeB/MgO,” (oral),
 Louis Neel Colloquium, Paris, France, September 24-27, 2017
250. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Use of analog spintronics device in performing neuro-morphic computing functions,”
 (invited),
 5th Berkeley Symposium on Energy Efficient Electronic System & Steep Transistors
 Workshop, UC Berkeley, U. S. A., October 19-20, 2017
251. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Analog spin-orbit torque devices with antiferromagnet for artificial neural networks,”
 (invited),
 Workshop on Antiferromagnetic Spintronics, MINATEC, Grenoble, France, October 25-27,
 2017
252. H. Ohno,
 “Spintronics, a Route to Stand-by Power-free Integrated Circuits,” (*Keynote*),
 Tohoku University-National Chiao Tung University 2nd Technical Workshop 2017, Sendai,
 Japan, November 3, 2017
253. H. Ohno,
 “Spin on integrated circuits,” (invited),

62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2017

254. M. Bersweiler, H. Sato, E. I. Enobio, and H. Ohno,
“Effect of capping layer material on interfacial anisotropy in
MgO/CoFeB/Ta/CoFeB/MgO/capping layer structure,” (oral),
62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2017
255. J. Igarashi, J. Llandro, H. Sato, S. Fukami, and H. Ohno,
“Out-of-plane field dependence of switching current in CoFeB/MgO magnetic tunnel
junctions with perpendicular easy axis at low temperature,” (oral),
62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2017
256. S. Fukami, W. A. Borders, A. Kurenkov, H. Akima, S. Moriya, S. Kurihara, Y. Horio, S. Sato,
and H. Ohno,
“An analog spin-orbit torque device for edge artificial intelligence,” (invited),
62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2017
257. C. Zhang, S. DuttaGupta, Y. Takahashi, H. Sato, S. Fukami, and H. Ohno,
“Magnetization switching by combining spin-orbit torque and spin-transfer torque in
three-terminal magnetic tunnel junctions,” (oral),
62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2018
258. S. DuttaGupta, T. Kanemura, A. Kurenkov, C. Zhang, S. Fukami, and H. Ohno,
“Characterization of spin-orbit torque and Dzyaloshinskii-Moriya interaction in an
antiferromagnet/ferromagnet structure,” (oral),
62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A.,
November 6-10, 2018
259. C. Zhang, B. Jinnai, S. Fukami, H. Sato, K. Watanabe, A. Kurenkov, M. Bersweiler, S.
DuttaGupta, and H. Ohno,
“Spin-orbit torque switching of nanoscale devices for high-speed MRAMs,” (poster),
IEDM MRAM Poster Session, San Francisco, U. S. A., December 2-6,
260. S. Fukami and H. Ohno,
“Spin-orbit torque switching for ultralow-power VLSI and AI hardware,” (invited),
9th MRAM Global Innovation Forum, San Francisco, U. S. A., December 7, 2017
261. W. A. Borders, H. Akima, S. Fukami, S. Moriya, S. Kurihara, A. Kurenkov, Y. Horio, S. Sato
and H. Ohno,
“An artificial neural network built with analogue spin-orbit torque devices,” (invited),
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
262. S. Fukami, C. Zhang, and H. Ohno,
“Sub-nanosecond field-free spin-orbit torque switching,” (invited),
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
263. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno,
“High performance single-digit-nanometer perpendicular magnetic tunnel junctions,”
(invited),
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017

264. S. DuttaGupta, T. Kanemura, A. Kurenkov, C. Zhang, S. Fukami, and H. Ohno,
 “Antiferromagnet layer thickness dependence of spin-orbit torque and Dzyaloshinskii-Moriya interaction in PtMn/[Co/Ni] structure,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
265. N. Ichikawa, T. Dohi, A. Okada, H. Sato, S. Fukami, and H. Ohno,
 “CoFeB thickness dependence of electric-field effect on domain structures in Ta/CoFeB/MgO,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
266. M. Shinozaki, J. Igarashi, H. Sato, and H. Ohno,
 “Effect of free layer size on magnetic anisotropy in nanoscale CoFeB/MgO magnetic tunnel junctions,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
267. E. Jackson, S. DuttaGupta, S. Fukami, H. Ohno, M. Sun, T. Kubota, K. Takanashi, and A. Hirohata,
 “Imaging interfaces in magnetic multilayers and devices using a decelerated electron beam,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
268. J. Igarashi, J. Llandro, H. Sato, and H. Ohno,
 “Magnetic-field-angle dependence of coercivity in nano-scale perpendicular-anisotropy CoFeB/MgO magnetic tunnel junctions,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
269. J. Igarashi, J. Llandro, H. Sato, S. Fukami, and H. Ohno,
 “Dependence of switching current on out-of-plane field in nano-scale perpendicular-anisotropy CoFeB/MgO magnetic tunnel junctions at low temperature,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
270. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno,
 “Spin-orbit torque switching in Co/Pt multilayers for nanoscale MRAM with high thermal stability,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
271. C. Zhang, S. Fukami, S. DuttaGupta, H. Sato, and H. Ohno,
 “Spin-orbit torque induced magnetization switching in W/CoFeB/MgO structure of various sizes,” (poster),
 15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
272. H. Sato, P. Chureemart, F. Matsukura, R. W. Chantrell, H. Ohno, and R. F. L. Evans,
 “Temperature dependence of spontaneous magnetization and magnetic anisotropy in CoFeB/MgO thin films: experiments versus simulations,” (invited),
 6th Core-to-core Workshop on “New-Concept Spintronic Devices,” Sendai, Japan, December 15-16, 2017
273. S. Fukami,
 “Analog spin-orbit torque devices for artificial neural networks,” (invited),
 Japan-Korea Spintronics Workshop, Seoul, Korea, December 18-20, 2017
274. H. Ohno,
 “Spintronics for information processing –from low-power integrated circuits to artificial

- intelligence,” (*keynote*),
Tsinghua-Tohoku Joint Workshop on Materials and Spintronics, Beijing, China, December 21, 2017
275. S. Fukami and H. Ohno,
“Spin-orbit torque switching in ferromagnetic heterostructures and its application,” (invited),
Reimei/GP-Spin/ICC-IMR International Workshop “New Excitations in Spintronics”, Sendai,
Japan, January 11, 2018
276. H. Ohno,
“Spintronics nanodevice-faster, smaller and more intelligent,” (invited),
Tohoku-Harvard Workshop, Sendai, Japan, January 18-19, 2018
277. S. Fukami,
“Analog spin-orbit torque devices for edge AI hardware,” (invited),
Tohoku-Purdue Workshop on Novel Spintronics Physics and Materials for Future Information
Processing, Sendai, Japan, February 18, 2018
278. H. Ohno,
“Nano-spintronics Devices for Integrated Circuits and Artificial Intelligence,” (invited),
Kick-off Symposium for World Leading Research Centers -Materials Science and
Spintronics-, Sendai, Japan, February 19-20, 2018
279. H. Sato, K. Watanabe, B. Jinnai, S. Fukami, and H. Ohno,
“Development of (Co)FeB/MgO-based magnetic tunnel junctions down to X nm,” (invited),
Tohoku/SG-Spin Workshop on Spintronics, Sendai, Japan, February 20-21, 2018
280. H. Ohno,
“Spintronics Nanoelectronics –Faster, smaller, and smaller-,” (invited),
4th CIES Technology Forum, Tokyo, Japan, March 22, 2018
281. S. Fukami and H. Ohno,
“Nonvolatile memory devices with magnetic nanowires controlled by spin-transfer and
spin-orbit torques,” (invited)
IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
2018/04/23-2018/04/28.
282. H. Ohno,
“Spintronics Nanodevices,” (plenary)
IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
2018/04/23-2018/04/28.
283. B. Jinnai, H. Sato, S. Fukami, and H. Ohno,
“Nanoscale spin-orbit torque devices with Co/Pt multilayers for wide-temperature range
applications,” (oral)
IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
2018/04/23-2018/04/28.
284. Y. Takeuchi, C. Zhang, A. Okada, H. Sato, S. Fukami, and H. Ohno,
“Harmonic measurement of current induced spin-orbit torques in
high-resistivity-W/CoFeB/MgO,” (oral)
IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
2018/04/23-2018/04/28.
285. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno,
“X nm Magnetic Tunnel Junctions with Perpendicular Anisotropy,” (oral)
IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
2018/04/23-2018/04/28.

286. N. Ichikawa, T. Dohi, A. Okada, H. Sato, S. Fukami, and H. Ohno,
 “Electric-field effect on the exchange stiffness in CoFeB/MgO stacks,” (oral)
 IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
 2018/04/23-2018/04/28.
287. M. Shinozaki, J. Igarashi, H. Sato, and H. Ohno,
 “Effect of free-layer size on magnetic properties in nanoscale magnetic tunnel junctions,”
 (oral)
 IEEE International Magnetism Conference (INTERMAG 2018), Singapore,
 2018/04/23-2018/04/28.
288. S. Fukami,
 “Potential and challenges of nonvolatile spintronics devices for integrated circuits
 applications,” (invited lecture)
 7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern “New concepts for
 future spintronic devices”, Kaiserslautern, Germany, 2018/05/28-2018/05/30.
289. K. Watanabe, B. Jinnai, H. Sato, S. Fukami, and H. Ohno,
 “Shape-anisotropy magnetic tunnel junctions,” (poster)
 7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern, Kaiserslautern,
 Germany, 2018/05/28-2018/05/30.
290. Y. Takeuchi, C. Zhang, A. Okada, H. Sato, S. Fukami, and H. Ohno,
 “Extended harmonic Hall measurement of spin-orbit torques in
 high-resistivity-W/CoFeB/MgO,” (poster)
 7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern, Kaiserslautern,
 Germany, 2018/05/28-2018/05/30.
291. J. Igarashi, M. Shinozaki, J. Llandro, H. Sato, and H. Ohno,
 “Dependence of magnetic anisotropy on free-layer size in nanoscale magnetic tunnel
 junctions,” (poster)
 7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern, Kaiserslautern,
 Germany, 2018/05/28-2018/05/30.
292. S. Fukami, C. Zhang, W. A. Borders, A. Kurenkov, S. DuttaGupta, and H. Ohno,
 “Spin-orbit torque switching and its applications – from high-speed memory to artificial
 neural network,” (invited)
 5th International Conference of Asian Union of Magnetism Societies (IcAUMS 2018), Jeju,
 Korea, 2018/06/03-2018/06/07.
293. E. Jackson, J. Kim, S. DuttaGupta, S. Fukami, H. Ohno, M. Sun, T. Kubota, K. Takanashi,
 and A. Hirohata,
 “Non-Destructive Imaging of Buried Junctions Using Scanning Electron Microscopy,” (oral)
 The 5th International Conference of Asian Union of Magnetism Societies (IcAUMS 2018),
 Jeju, Korea, 2018/06/03-2018/06/07.
294. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Spintronic analog memory for neuromorphic computing,” (invited)
 14th International Conference on Modern Materials and Technologies (CIMTEC2018),
 Perugia, Italy, 2018/06/04-2018/06/14.
295. H. Sato, K. Watanabe, B. Jinnai, S. Fukami, H. Honjo, S. Ikeda, T. Endoh, and H. Ohno,
 “High-performance (Co)FeB/MgO-based magnetic tunnel junctions with perpendicular easy
 axis down to single-digit nanometer scale,” (invited)
 2018 Spintronics Workshop on LSI, Honolulu, Hawaii, USA, 2018/06/17.
296. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Neuromorphic computing with analog spin-orbit torque device,” (invited)

Workshop on Spintronics and Nanomagnetism for Neuromorphic Computing, Leeds, UK, 2018/06/26-2018/06/27.

297. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Analog spin-orbit torque devices for artificial neural networks," (invited) The 21st International Conference on Magnetism (ICM2018), San Francisco, USA, 2018/07/16-2018/07/20.
298. Y. Takeuchi, K. Furuya, Y. Takahashi, C Zhang, A. Okada, B. Jinnai, H. Sato, S. Fukami, and H. Ohno, "Spin-orbit torque in W/CoFeB/MgO heterostructures – Wide-range W resistivity dependence," (poster) The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
299. A. Kurenkov, M. Baumgartner, G. Sala, G. Krishnaswamy, F. Maccherozzi, S. Fukami, P. Gambardella, and H. Ohno, "Observation of domains during spin-orbit torque induced memristive switching in antiferromagnet/ferromagnet heterostructures," (oral) The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
300. S. DuttaGupta, A. Kurenkov, R. Itoh, A. Okada, S. Fukami, and H. Ohno, "Angular dependence of magnetoresistance in asymmetric and symmetric nonmagnet/antiferromagnet metallic heterostructures," (oral) The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
301. R. Itoh, Y. Takeuchi, S. DuttaGupta, S. Fukami and H. Ohno, "Spin-orbit torque of PtMn/CoFeB evaluated by extended harmonic Hall measurement," (poster) The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
302. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno, "Magnetization reversal mechanism of shape-anisotropy magnetic tunnel junctions," (poster) The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
303. Y. Takahashi, Y. Takeuchi, C Zhang, B. Jinnai, S. Fukami and H. Ohno, "Spin-orbit torque induced switching of in-plane nanomagnet arrays evaluated through differential planar Hall effect," The 21st International Conference on Magnetism (ICM2018), San Francisco, CA, USA, 2018/07/16-2018/07/20.
304. S. Fukami, C. Zhang, B. Jinnai, and H. Ohno, "Spin-orbit torque switching device for high-performance and low-power integrated circuits," (invited) The 23rd International Colloquium on Magnetic Films and Surfaces (ICMFS-2018), UC Santa Cruz, USA, 2018/07/22-2018/07/27.
305. S. DuttaGupta, R. Itoh, S. Fukami, and H. Ohno, "Angular dependence of magnetoresistance in nonmagnet/antiferromagnet bilayer structure," (invited) Tohoku-Tsinghua Joint Workshop on Materials and Spintronics Sciences, Sendai, Japan, 2018/07/26.
306. H. Ohno, "Opening - from PASPS-1 to PASPS-10," (invited)

The 10th International School and Conference on Physics and Applications of Spin Phenomena in Solids – PASPS10, Linz, Austria, 2018/08/05-2018/08/09.

307. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, “Neuromorphic computing with analog spin-orbit torque devices,” (invited)
The 10th International School and Conference on Physics and Applications of Spin Phenomena in Solids – PASPS10, Linz, Austria, 2018/08/05-2018/08/09.
308. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno, “Magnetic tunnel junction scaling into the single-digit nanometer regime,” (oral)
10th International School and Conference on Physics and Applications of Spin Phenomena in Solids (PASPS10), Linz, Austria, 2018/08/05-2018/08/09.
309. J. Igarashi, J. Llandro, M. Shinozaki, H. Sato, S. Fukami, and H. Ohno, “Influence on magnetization switching of edge effects in nano-scale perpendicular-anisotropy CoFeB/MgO magnetic tunnel junctions,” (poster)
10th International School and Conference on Physics and Applications of Spin Phenomena in Solids (PASPS10), Linz, Austria, 2018/08/05-2018/08/09.
310. W. A. Borders, S. Fukami, and H. Ohno, “Antiferromagnet/Ferromagnet Based Spin-Orbit Torque Devices for Hopfield Network Applications (Invited),” (invited)
Explorative Workshop: Spintronic Perspectives on Neuromorphic Computing, Jülich, Germany, 2018/08/13-2018/08/15.
311. G. Krishnaswamy, A. Kurenkov, G. Sala, M. Baumgartner, F. Maccherozzi, S. Fukami, P. Gambardella, and H. Ohno, “Spin-orbit torque induced domain switching in antiferromagnet / ferromagnet heterostructures,” (oral)
Annual Meeting of the Swiss Physical Society (SPS), Lausanne, Switzerland, 2018/08/28-2018/08/31.
312. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, “Analog spintronics device for artificial neural networks,” (invited)
The 2018 International Symposium on Nonlinear Theory and Its Applications (NOLTA2018), Tarragona, Spain, 2018/09/02-2018/09/06.
313. G. Krishnaswamy, A. Kurenkov, G. Sala, M. Baumgartner, F. Maccherozzi, S. Fukami, P. Gambardella, and H. Ohno, “Spin-orbit torque induced domain switching in antiferromagnet / ferromagnet heterostructures,” (oral)
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314. S. DuttaGupta, R. Itoh, S. Fukami, and H. Ohno, “Angle dependent magnetoresistance in nonmagnet/antiferromagnet metallic heterostructures,” (oral)
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315. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, “Associative memory operation using analog spin-orbit torque device,” (invited)
SPICE Workshop - Spintronics meets Neuromorphics, Mainz, Germany, 2018/10/08-2018/10/12.
316. C. Zhang, Y. Takeuchi, S. Fukami, and H. Ohno, “Spin-orbit torque switching in nanoscale devices – physics and material engineering,” (invited)
KITS Workshop 2018, Beijing, China, 2018/10/01-2018/10/19.

317. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno, "Spin-orbit torque switching in perpendicular-magnetized Co/Pt multilayers," (poster) NIMS Academic Symposium, Tokyo, Japan, 2018/10/15.
318. Y. Takahashi, Y. Takeuchi, C. Zhang, B. Jinnai, S. Fukami, and H. Ohno, "Spin-orbit torque switching in in-plane nanomagnets characterized by planar Hall effect," (poster) NIMS Academic Symposium, Tokyo, Japan, 2018/10/15.
319. H. Ohno, "Spintronics Nanodevices," 14th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures & 26th International Colloquium on Scanning Probe Microscopy (ACSIN-14 & ICSPM26), Sendai, Japan, 2018/10/21-2018/10/25.
320. S. Kanai, Y. Nakatani, F. Matsukura, and H. Ohno, "Thermal effect in magnetization dynamics induced by electric-field in a magnetic tunnel junction," (poster) CSRN-Osaka Annual Workshop 2018, Nambu Yoichiro Hall, Osaka University, 2018/12/13-2018/12/15.
321. S. Fukami and H. Ohno, "Spin-Orbit Torque Switching in Nanoscale Devices: Material and Device Engineering," (invited) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
322. B. Jinnai, H. Sato, S. Fukami, and H. Ohno, "Wide-temperature spin-orbit torque switching operation in high-thermal-stability Co/Pt-multilayer nanowire device," (poster) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
323. S. DuttaGupta, R. Itoh, S. Fukami, and H. Ohno, "Angular dependence of longitudinal and transverse magnetoresistance in antiferromagnet/nonmagnet metallic heterostructures," (poster) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
324. C. Zhang, S. Fukami, S. DuttaGupta, H. Sato, and H. Ohno, "Time and spatial evolution of spin-orbit torque-induced switching in W/CoFeB/MgO," (poster) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
325. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno, "Magnetization Reversal of a 1X/X nm Perpendicular Shape-Anisotropy MTJ," (poster) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
326. T. Dohi, S. DuttaGupta, S. Fukami, and H. Ohno, "Ferromagnet thickness dependence of effective Dzyaloshinskii-Moriya field in W/(Co)FeB/MgO systems," (poster) 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on "New-Concept Spintronic Devices", Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.

327. J. Igarashi, M. Shinozaki, J. Llandro, H. Sato, S. Fukami and H. Ohno,
 “Effects of free layer size on magnetic properties and current induced magnetization switching in nanoscale CoFeB/MgO magnetic tunnel junctions,” (poster)
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328. W. A. Borders, S. Fukami, and H. Ohno,
 “Analogue Spin-Orbit Torque Devices for Artificial Neural Network Applications,” (poster)
 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on “New-Concept Spintronic Devices”, Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
329. Y. Takahashi, Y. Takeuchi, C. Zhang, B. Jinnai, S. Fukami, and H. Ohno,
 “Spin-orbit torque-induced switching of in-plane magnetized elliptic nanodots detected using planar Hall effect,” (poster)
 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on “New-Concept Spintronic Devices”, Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
330. R. Itoh, Y. Takeuchi, S. DuttaGupta, S. Fukami, and H. Ohno,
 “Antiferromagnet layer thickness dependence of spin-orbit torque in PtMn/CoFeB structures,” (poster)
 16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on “New-Concept Spintronic Devices”, Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
331. S. Fukami and H. Ohno,
 “Spin-Orbit Torque Switching in Nanoscale Devices: Material and Device Engineering,”
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332. M. Shinozaki, T. Dohi, J. Igarashi, J. Llandro, S. Kanai, S. Fukami, H. Sato, and H. Ohno,
 “Edge state of nanoscale magnetic tunnel junctions proved by spin-wave resonance,” (oral)
 2019 Joint MMM-Intermag Conference, Washington, DC, USA, 2019/01/14-2019/01/18.
333. C. Zhang, Y. Takeuchi, Y. Takahashi, S. Fukami, and H. Ohno,
 “Sub-ns and low-power magnetization switching by combination of spin-orbit torque and spin-transfer torque,” (oral)
 2019 Joint MMM-Intermag Conference, Washington DC, USA, 2019/01/14-2019/01/18.
334. K. Furuya, Y. Takeuchi, C. Zhang, B. Jinnai, S. Fukami, and H. Ohno,
 “Relationship between spin-orbit torque switching efficiency and W resistivity in W/CoFeB/MgO,” (oral)
 2019 Joint MMM-Intermag Conference, Washington DC, USA, 2019/01/14-2019/01/18.
335. T. Dohi, S. DuttaGupta, Y. Takeuchi, S. Fukami, and H. Ohno,
 “Sign reversal of Dzyaloshinskii-Moriya effective field with ferromagnetic layer thickness in W/(Co)FeB/MgO heterostructures,” (oral)
 2019 Joint MMM-Intermag Conference, Washington DC, USA, 2019/01/14-2019/01/18.
336. M. Bersweiler, H. Sato, and H. Ohno,
 “Magnetic and free-layer properties of MgO/(Co)FeB/MgO structure: Dependence on CoFeB composition,” (oral)
 2019 Joint MMM-Intermag Conference, Washington DC, USA, 2019/01/14-2019/01/18.
337. J. Igarashi, S. Kanai, M. Shinozaki, J. Llandro, H. Sato, S. Fukami, and H. Ohno,
 “Asymmetric distortion of Astroid curve with current bias in nanoscale magnetic tunnel

junction,” (oral)
2019 Joint MMM-Intermag Conference, Washington DC, USA, 2019/01/14-2019/01/18.

338. M. Shinozaki, J. Igarashi, J. Llandro, S. Fukami, H. Sato, and H. Ohno,
“Size Dependence of the Influence of Edge Effects in Nanoscale Perpendicular-Anisotropy Magnetic Tunnel Junctions,” (invited)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
339. K. Watanabe, B. Jinnai, S. Fukami, H. Sato and H. Ohno,
“1X and X nm Perpendicular-easy-axis Magnetic Tunnel Junctions utilizing Shape Anisotropy,” (invited)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
340. S. Fukami and H. Ohno,
“Spin orbitronics for high-speed memory and artificial neural network,” (invited)
2nd Tohoku/SG-SPIN Workshop in Spintronics, National University of Singapore, Singapore, 2019/02/22-2019/02/23.
341. S. Fukami,
“Spintronic Devices for Neural Networks,” (invited)
APS March Meeting 2019, Boston, Massachusetts, USA, 2019/03/03-2019/03/07.

(4) 査読なし国際会議・シンポジウム等 / Papers in conference proceedings

1. S. Kanai,
“Electric field-induced magnetization switching in CoFeB-MgO under magnetic fields,” (poster),
Summer School and Annual Meeting on Advanced Spintronic Materials and Transport Phenomena (ASPIMATT), Dresden, Germany, July 1-5, 2013
2. S. Miyakozawa,
“Molecular beam epitaxy and characterization of Li codoped (Ga,Mn)As,” (poster),
Summer School and Annual Meeting on Advanced Spintronic Materials and Transport Phenomena (ASPIMATT), Dresden, Germany, July 1-5, 2013
3. A. Okada,
“Electric field dependence of magnetic properties of CoFeB investigated by ferromagnetic resonance”, (poster),
Summer School and Annual Meeting on Advanced Spintronic Materials and Transport Phenomena (ASPIMATT), Dresden, Germany, July 1-5, 2013
4. L. Chen, F. Matsukura, T. Dietl, and H. Ohno,
“Electric-field modulation of damping constant in (Ga,Mn)As,” (poster), AIMR International Symposium 2014 (AMIS), Sendai, Japan, February 17-19, 2014
5. S. D’Ambrosio, L. Chen, F. Matsukura, T. Dietl, and H. Ohno,
“ZnO as a spintronics material,” (poster),
AIMR International Symposium 2014 (AMIS), Sendai, Japan, February 17-19, 2014
6. T. Dohi, S. Kanai, A. Okada, F. Matsukura and H. Ohno,
“Electric-field effect on magnetic domain structures in MgO/CoFeB/Ta through the modulations of magnetic anisotropy and exchange stiffness,” (poster),
3rd Workshop of the Core-to-core Project Tohoku-York-Kaiserslautern, New concepts for future spintronic devices, Kaiserslautern, Germany, June 22-24, 2016
7. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura and H. Ohno,
“Evaluation of damping constant in a nanoscale magnetic tunnel junction by

- homodyne-detected ferromagnetic resonance,” (poster),
3rd Workshop of the Core-to-core Project Tohoku-York-Kaiserslautern, New concepts for future spintronic devices, Kaiserslautern, Germany, June 22-24, 2016
8. Y. Y. Kim, A. Okada, S. Miyakozawa, S. Kanai, F. Matsukura, J. Aldous, H. E. Beere, D. A. Ritchie, H. Ohno and A. Hirohata,
“Development of spin-polarised transistor,” (oral)
3rd Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern, New concepts for future spintronic devices, Kaiserslautern, Germany, June 22-24, 2016
 9. C. Zhang, S. Fukami, H. Sato, F. Matukura, and H. Ohno,
“Spin-orbit torque induced magnetization switching in nanoscale Ta/CoFeB/MgO dots,” (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 10. M. Bersweiler, K. Watanabe, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Magnetic properties of MgO/FeV/MgO and MgO/Fe/FeV/Fe/MgO structures for spintronics integrated circuits, (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 11. H. Sato, S. Fukami, S. Ikeda, and H. Ohno,
“Two- and three-terminal devices for spintronics based integrated circuits,” (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 12. H. Ohno, T. Endoh, T. Hanyu, and S. Ikeda,
“Overview of spintronic integrated circuit project,” (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 13. M. Natsui, A Tamakoshi, T. Endoh, H. Ohno, and T. Hanyu,
“Design of an MTJ-based nonvolatile LSI for energy-efficient microcontroller unit,” (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 14. Y. Ma, S. Miura, H. Honjo, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh,
“A 600- μ W ultra-low-power associative processor based on MTJ nonvolatile memories with autonomic intelligent power-gating scheme,” (poster),
2nd ImPACT International Symposium on Spintronic Memory, Circuit and Storage, Tsukuba, Japan, September 30, 2016
 15. C. Zhang, S. Fukami, K. Watanabe, A. Ohkawara, S. DuttaGupta, H. Sato, F. Matsukura, and H. Ohno
“Spin-orbit torque-induced magnetization switching in nanoscale W/CoFeB/MgO,” (poster),
York-Tohoku-Kaiserslautern Symposium on “New-Concept Spintronics Devices” York, UK, June 21-23, 2017
 16. S. DuttaGupta, C. Zhang, S. Fukami, and H. Ohno,
“Distinct behavior of Dzyaloshinskii-Moriya domain walls in thermally-activated and flow regime domain wall motion,” (poster),
York-Tohoku-Kaiserslautern Symposium on “New-Concept Spintronics Devices” York, UK, June 21-23, 2017
 17. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno,
“Spin-orbit torque driven magnetization reversal in Co/Pt multilayer,” (poster),
3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai, Japan, September 23-25, 2017

18. C. Zhang, S. Fukami, K. Watanabe, A. Ohkawara, S. DuttaGupta, H. Sato, F. Matsukura, and H. Ohno,
 “Spin-orbit torque-induced magnetization reversal in nanoscale W/CoFeB/MgO,” (poster),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
19. M. Bersweiler, H. Sato, and H. Ohno,
 “Effect of CoFeB composition on magnetic and free-layer properties of MgO/(Co)FeB/MgO
 structure,” (poster),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
20. S. DuttaGupta, C. Zhang, S. Fukami, and H. Ohno,
 “Quantifying Dzyaloshinskii-Moriya interaction from thermally-activated and flow regime
 domain wall dynamics,” (poster),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
21. J. Igarashi, J. Llandro, H. Sato, and H. Ohno,
 “Coercivity dependent on magnetic-field-angle in a nanoscale CoFeB-MgO magnetic tunnel
 junction with perpendicular easy axis,” (poster),
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai,
 Japan, September 23-25, 2017
22. J. Igarashi, J. Llandro, H. Sato, S. Fukami, and H. Ohno,
 “Investigating the influence on magnetization switching of edge effects in nanoscale
 CoFeB/MgO perpendicular magnetic-tunnel junctions,” (poster),
 Tohoku-Harvard Workshop, Sendai, Japan, January 18-19, 2018
23. S. Fukami, C. Zhang, W. A. Borders, A. Kurenkov, S. DuttaGupta, B. Jinnai, H. Sato and H.
 Ohno,
 “Spin-orbit torque induced magnetization switching for integrated circuits and neuromorphic
 computing,” (poster),
 Tohoku-Harvard Workshop, Sendai, Japan, January 18-19, 2018
24. N. Ichikawa, T. Dohi, A. Okada, H. Sato, S. Fukami and H. Ohno,
 “Electric-field effect on domain structures in Ta/CoFeB/MgO,” (poster),
 Kick-off Symposium for World Leading Research Centers -Materials Science and
 Spintronics-, Sendai, Japan, February 19-20, 2018
25. S. DuttaGupta, A. Kurenkov, S. Fukami, C. Zhang, and H. Ohno,
 “Thickness Dependence of Spin-orbit Torque and Dzyaloshinskii-Moriya Interaction in an
 Antiferromagnet/Ferromagnet Heterostructure,” (poster),
 Kick-off Symposium for World Leading Research Centers -Materials Science and
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26. B. Jinnai, C. Zhang, A. Kurenkov, M. Bersweiler, H. Sato, S. Fukami, and H. Ohno,
 “Spin-orbit-torque-induced magnetization switching in perpendicularly-magnetized Co/Pt
 multilayers with high thermal stability,” (poster),
 Kick-off Symposium for World Leading Research Centers -Materials Science and
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27. C. Zhang, S. Fukami, S. DuttaGupta, H. Sato, and H. Ohno,
 “Magnetization switching induced by spin-orbit torque in W/CoFeB/MgO devices with
 various sizes,” (poster),
 Kick-off Symposium for World Leading Research Centers -Materials Science and
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28. S. Fukami and H. Ohno,
 “Spin-orbit torque induced magnetization switching and its applications,” (poster),

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29. J. Igarashi, J. Llandro, H. Sato, S. Fukami, and H. Ohno,
“An effect of out-of-plane external magnetic field on switching current in nanoscale CoFeB/MgO magnetic tunnel junction with perpendicular easy axis,” (poster),
Kick-off Symposium for World Leading Research Centers -Materials Science and Spintronics-, Sendai, Japan, February 19-20, 2018
30. M. Shinozaki, J. Igarashi, H. Sato and H. Ohno,
“Free-layer size dependence of magnetic properties in CoFeB/MgO nanoscale magnetic tunnel junctions,” (poster),
Kick-off Symposium for World Leading Research Centers -Materials Science and Spintronics-, Sendai, Japan, February 19-20, 2018
31. H. Sato, P. Chureemart, F. Matsukura, R. W. Chantrell, H. Ohno, and R. F. L. Evans,
“Dependence of spontaneous magnetization and magnetic anisotropy in CoFeB/MgO structure on temperature: experiments versus simulations,” (poster),
Kick-off Symposium for World Leading Research Centers -Materials Science and Spintronics-, Sendai, Japan, February 19-20, 2018
32. S. Gupta, S. Kanai, F. Matsukura, and H. Ohno,
“Ferromagnetic Resonance Spectra of Permalloy Deposited on $(\text{Bi}_{1-x}\text{Sb}_x)_2\text{Te}_3$,” (poster),
Kick-off Symposium for World Leading Research Centers -Materials Science and Spintronics-, Sendai, Japan, February 19-20, 2018
33. S. Kanai, Y. Nakatani, F. Matsukura, and H. Ohno,
“Magnetization Dynamics Induced by Electric-field in a Nanoscale Magnetic Tunnel Junction,” (poster)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
34. S. DuttaGupta, R. Itoh, S. Fukami and H. Ohno,
“Spin Hall Magnetoresistance in antiferromagnet/non-magnet metallic heterostructures,” (poster)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
35. B. Jinnai, H. Sato, S. Fukami, and H. Ohno,
“Magnetization switching induced by spin-orbit torques in Co/Pt multilayer nanowire device over a wide range of temperatures,” (poster)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
36. A. Kurenkov, M. Baumgartner, G. Sala, G. Krishnaswamy, F. Maccherozzi, S. Fukami, P. Gambardella, and H. Ohno,
“Observation of domains during spin-orbit torque induced memristive switching in antiferromagnet/ferromagnet heterostructures,” (poster)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
37. C. Zhang, Y. Takeuchi, Y. Takahashi, S. Fukami, and H. Ohno,
“Sub-ns switching by combining SOT and STT in MTJ devices,” (poster)
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
38. T. Dohi, S. DuttaGupta, S. Fukami, and H. Ohno,
“Sign change of effective Dzyaloshinskii-Moriya field with varying ferromagnet thickness in W/(Co)FeB/MgO systems,” (oral)

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39. Y. Takeuchi, K. Furuya, Y. Takahashi, B. Jinnai, C. Zhang, S. Fukami, and H. Ohno, "Engineering of spin-orbit torques in W/CoFeB/MgO heterostructures for efficient control of magnetization," (oral)
2nd Tohoku/SG-SPIN Workshop in Spintronics, National University of Singapore, Singapore, 2019/02/22-2019/02/23.

(5) 総説・解説 / Review articles

1. 深見俊輔、大野英男
「スピントロニクス論理集積回路の実現に向けた3端子磁壁移動素子の開発」
工業材料(日刊工業新聞社), 2014年1月号
2. 深見俊輔、張 超亮、姉川 哲朗、Samik DuttaGupta、Aleksandr Kurenkov、大野 英男
「スピン軌道トルク磁化反転とその集積回路応用」
日本磁気学会第208回研究会資料 pp. 15-22 (2016).
3. 深見俊輔、姉川哲朗、大河原綾人、張 超亮、大野英男
「3端子スピン軌道トルク磁気メモリ素子 ～ 高速低消費電力不揮発性集積回路の実現を目指して～」
信学技報, vol. 116, no. 172, SDM2016-63, pp. 99-103, 2016年8月.
4. 深見俊輔
「IoT高性能化の切り札 超高速不揮発メモリ」
セラミックス, vol. 51, no. 11, p. 801 (2016).
5. 深見俊輔、大野英男
「スピン軌道トルクによる高速磁化反転とその応用」
応用物理, vol. 86, No. 7, pp. 565-569 (2017).
6. 深見俊輔、William A. Borders, Aleksandr Kurenkov, 張超亮, Samik DuttaGupta, 大野英男
「アナログスピン軌道トルクを用いた人工ニューラルネットワーク」
日本磁気学会第216回研究会資料, pp. 15-20 (2018).
7. 深見俊輔、大野英男
「反強磁性金属を用いたスピン軌道トルク磁化反転」
日本磁気学会誌『まぐね』, vol. 13, No. 5, pp. 223-228 (2018).
8. 深見俊輔、大野英男

「限界に迫る極微細高性能磁気トンネル接合素子の開発」
パリティ、2018年12月号, Vol. 33, No. 12, pp. 60-63 (2018).

(6) 査読付国内会議 / Refereed proceedings in domestic conferences

non

(7) 査読なし国内研究会・講演会 / Proceedings in domestic conferences

1. 池田正二、佐藤英夫、山ノ内路彦、深見俊輔、水沼広太郎、金井駿、石川慎也、松倉文礼、笠井直記、大野英男、
“不揮発性集積回路応用に向けた CoFeB-MgO磁気トンネル接合の開発状況”、(招待)
独立行政法人 日本学術振興会 先端ナノデバイス・材料テクノロジー第151委員会
平成25年度 第1回研究会「最先端スピンドバイスと新しいスピン制御技術」東京
大学、平成25年5月9日
2. 都澤章平、陳林、松倉文礼、大野英男、
“Liを共添加した(Ga,Mn)Asの作製と評価” (ポスター)
第32回電子材料シンポジウム(EMS32)、ラフォーレ琵琶湖、平成25年7月10日～12日
3. 岡田篤、金井駿、山ノ内路彦、池田正二、松倉文礼、大野英男、
“Ta/CoFeB/MgO構造における磁気特性の電界効果の強磁性共鳴による検出” (ポスター)
第32回電子材料シンポジウム(EMS32)、ラフォーレ琵琶湖、平成25年7月10日～12日
4. 竹内祐太郎、水沼広太郎、石川慎也、佐藤英夫、池田正二、山ノ内路彦、深見俊輔、
松倉文礼、大野英男、
“垂直磁気異方性CoFeB-MgO磁気トンネル接合のトンネル磁気抵抗特性の温度依存性”
(ポスター)
第32回電子材料シンポジウム(EMS32)、ラフォーレ琵琶湖、平成25年7月10日～12日
5. 石川慎也
“Co/Pt多層膜CoFeB積層電極を用いた微細磁気トンネル接合の作製と特性評価”
東北大学電気通信研究所ナノ・スピン実験施設研究発表会、平成25年8月6日
6. 山ノ内路彦
“CuIrチャネルを用いた3端子磁気トンネル接合”
東北大学電気通信研究所ナノ・スピン実験施設研究発表会、平成25年8月6日
7. 山本直志、佐藤英夫、木下啓蔵、池田正二、大野英男、
“反応性イオンエッチングを用いた磁気トンネル接合の作製,” (oral),
第37回日本磁気学会学術講演会、北海道大学工学部、平成25年9月3日-6日
8. 深見俊輔、佐藤英夫、山ノ内路彦、池田正二、大野英男、
“垂直磁気異方性CoNi超格子膜の作製と磁気特性の評価,” (oral),
第37回日本磁気学会学術講演会、北海道大学工学部、平成25年9月3日-6日
9. 深見俊輔、山ノ内路彦、池田正二、大野英男、
“Co/Ni細線における磁壁デピニング確率の測定と計算,” (oral),
第37回日本磁気学会学術講演会、北海道大学工学部、平成25年9月3日-6日
10. ルークフリート、吉田健太、小林裕臣、金子雄基、松坂俊一郎、大野裕三、大野英男、
本多周太、井上順一郎、廣畑貴文, (oral),

“急峻なFe/GaAs(001)を介したスピン偏極電子の注入特性,”
第37回日本磁気学会学術講演会、北海道大学工学部、平成25年9月3日-6日

11. 石原淳、小野真証、大野裕三、大野英男
“核磁気共鳴を用いたGaAs/AlGaAs(110)量子井戸中における核スピンのコヒーレント操作,” (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
12. 都澤章平、陳林、松倉文礼、大野英男、
“Liを共添加した(Ga,Mn)Asの作製と評価,” (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
13. H. Chang, 秋田晋吾、松倉文礼、大野英男、
“電界効果構造中の(Ga,Mn)Sbチャンネルの磁気輸送特性”, (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
14. 山ノ内路彦、陳林、金俊延、林将光、佐藤英夫、深見俊輔、池田正二、松倉文礼、大野英男、
“CuIrチャンネル3端子磁気トンネル接合における電流誘起スイッチング”, (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
15. 張超亮、山ノ内路彦、佐藤英夫、深見俊輔、池田正二、松倉文礼、大野英男、
“垂直磁化容易Ta/CoFeB/MgO積層構造における電流誘起磁化反転”, (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
16. 金井駿、山ノ内路彦、池田正二、仲谷栄伸、松倉文礼、大野英男、
“電界誘起磁化歳差運動の実時間観測”, (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
17. 大野英男、
“スピントロニクスメモリ素子開発の現状と今後の展望,” (招待)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
18. 竹内祐太郎、水沼広太郎、石川慎也、佐藤英夫、池田正二、山ノ内路彦、深見俊輔、松倉文礼、大野英男、
“垂直磁気異方性CoFeB-MgO磁気トンネル接合素子の特性と温度依存性,” (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
19. 石川慎也、佐藤英夫、山ノ内路彦、池田正二、深見俊輔、松倉文礼、大野英男、
“Ta挿入層を有するCo/Pt多層膜ベース磁気トンネル接合,” (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日
20. 岡田篤、金井駿、山ノ内路彦、池田正二、松倉文礼、大野英男、
“強磁性共鳴法により検出したTa-CoFeB-MgO接合における磁気特性の電界効果の膜厚依存性”, (口頭)、
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日-20日

21. 吉村瑤子、小山知弘、森山貴広、K. J. Kim、千葉大地、仲谷栄伸、深見俊輔、山ノ内路彦、大野英男、小野輝男、
“垂直磁化Co/Ni細線中の磁壁電流駆動におけるスピントロニクス効果の影響、” (oral),
日本物理学会秋季大会、徳島大学、平成25年9月25日-28日
22. 河口真志、島村一利、深見俊輔、松倉文礼、大野英男、森山貴広、千葉大地、小野輝男、
“強磁性金属薄膜における電流誘起有効磁場の直流ホール測定による決定、” (oral),
日本物理学会秋季大会、徳島大学、平成25年9月25日-28日
23. 大野英男、
“スピントロニクスは日の丸半導体を救えるか”
東北大学電気通信研究所共同プロジェクト研究会「非平衡スピン・ゆらぎの精緻な制御と観測による新規ナノデバイスの開拓研究」、仙台、平成25年10月31日-11月1日
24. 山ノ内路彦、陳林、金俊延、林将光、佐藤英夫、深見俊輔、池田正二、松倉文礼、大野英男、
“Cuベースチャンネル3端子磁気トンネル接合、” (oral),
応用物理学会スピントロニクス研究会・日本磁気学会スピントロニクス専門研究会共同主催研究会「元素戦略、環境調和を視野に入れたスピントロニクスの新展開」
仙台、平成25年11月11日
25. 久保田修司、山ノ内路彦、佐藤英夫、池田正二、松倉文礼、大野英男
“垂直磁化容易CoFeB-MgO磁気トンネル接合における電流誘起磁化反転の面内磁場依存性”
応用物理学会東北支部講演会、山形大学、平成25年12月5日-6日
26. 堀川喜久、石川慎也、池田正二、佐藤英夫、山ノ内路彦、深見俊輔、松倉文礼、大野英男
“MgO/Fe(B)/MgO積層膜の磁気特性”
応用物理学会東北支部講演会、山形大学、平成25年12月5日-6日
27. 大野英男、
“スピントロニクスが拓く新しい集積回路の世界、”
FIRST研究成果ビジネスマッチングシンポジウム --日本の電子産業、復活の狼煙(のろし)--、仙台、平成26年1月22日
28. 大野英男、
“スピントロニクスが拓く新しい集積回路の世界”、
平成25年度最先端研究開発戦略的強化事業・最先端研究開発支援プログラムFIRST EXPO、東京、平成26年2月28日
29. 池田正二、
“スピントロニクス材料・デバイス開発(1)”、
省エネルギー・スピントロニクス論理集積回路の研究開発最終報告会、東京、平成26年3月14日
30. 張超亮、山ノ内路彦、佐藤英夫、深見俊輔、池田正二、松倉文礼、大野英男、
“Ta and CoFeB thickness dependence of sheet resistance in Ta/CoFeB/MgO heterostructures,” (ポスター)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
31. 深見俊輔、山ノ内路彦、池田正二、大野英男
“電流誘起磁壁移動素子のしきい電流と熱安定性の素子サイズ依存性、” (口頭)、

第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日

32. 大野英男、
“スピントロニクス技術を用いた論理集積回路、” (招待)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
33. 金井駿、仲谷栄伸、山ノ内路彦、池田正二、松倉文礼、大野英男、
“電界誘起磁化ダイナミクスの実時間観測、” (口頭)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
34. 平山絵里子、金井駿、佐藤浩司、山ノ内路彦、佐藤英夫、池田正二、松倉文礼、大野英男、
“Ferromagnetic resonance spectra of CoFeB-MgO magnetic tunnel junctions measured by homodyne detection,” (口頭)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
35. 石川慎也、佐藤英夫、山ノ内路彦、池田正二、深見俊輔、松倉文礼、大野英男、
“CoFeB/Ta/[Co/Pd]強磁性電極を用いた磁気トンネル接合、” (口頭)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
36. ハンジャン、Enobio Eli Christopher、佐藤英夫、石川慎也、山ノ内路彦、池田正二、深見俊輔、松倉文礼、大野英男、
“Current-induced switching properties under perpendicular magnetic field magnetic tunnel junctions with perpendicular magnetic easy axis,” (oral),
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
37. 堀川喜久、石川慎也、池田正二、佐藤英夫、深見俊輔、山ノ内路彦、松倉文礼、大野英男、
“MgO/FeB/MgO積層膜における磁気異方性の上部MgO層厚依存性、” (口頭)、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
38. K. J. Kim, R. Hiramatsu, T. Koyama, K. Ueda, Y. Yoshimura, D. Chiba, K. Kobayashi, Y. Nakatani, S. Fukami, M. Yamanouchi, H. Ohno, H. Kohno, G. Tatara and T. Ono,
“Two-barrier stability that allows low-power operation in current-induced domain-wall,” (oral),
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
39. S. DuttaGupta, S. Fukami, M. Yamanouchi, C. Zhang, H. Sato, S. Ikeda, F. Matsukura, and H. Ohno,
“Current induced domain wall creep in Ta/CoFeB/MgO/Ta wire,” (oral),
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
40. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
“Electric field effects on Li codoped (Ga,Mn)As,” (oral),
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日

41. A. Okada, S. Kanai, M. Yamanouchi, S. Ikeda, F. Matsukura, and H. Ohno,
 “Temperature dependence of electric-field on magnetic properties of Ta/CoFeB/MgO structures investigated by ferromagnetic resonance,” (oral),
 第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
42. S. Kanai, H. Sato, M. Yamanouchi, S. Ikeda, Y. Nakatani, F. Matsukura, and H. Ohno,
 “Magnetization switching by two successive voltage pulses,” (oral),
 第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
43. 河口真志、島村一利、深見俊輔、松倉文礼、大野英男、森山貴広、千葉大地、小野輝男、
 “強磁性金属薄膜における電流誘起有効磁場の膜厚依存性” (口頭)、
 日本物理学会秋季大会、東海大学湘南キャンパス、平成26年3月27日-30日
44. S. Kanai, H. Sato, M. Yamanouchi, S. Ikeda, Y. Nakatani, F. Matsukura, and H. Ohno,
 “Magnetization reversal mode switching and its application”,(oral),
 33rd Electronic Materials Symposium (EMS-33), Shuzenji, Japan, July 9-11, 2014
45. E. Hirayama, S. Kanai, K. Sato, M. Yamanouchi, H. Sato, S. Ikeda, F. Matsukura, and H. Ohno,
 “Ferromagnetic resonance spectra of CoFeB-MgO magnetic tunnel junction measured by homodyne detection”, (oral),
 33rd Electronic Materials Symposium (EMS-33), Shuzenji, Japan, July 9-11, 2014
46. K. Watanabe, S. Ishikawa, H. Sato, S. Ikeda, M. Yamanouchi, S. Fukami, F. Matsukura, and H. Ohno,
 “CoFeB and Ta capping layer thicknesses dependence of magnetic properties for MgO/CoFeB/Ta stacks”, (oral),
 33rd Electronic Materials Symposium (EMS-33), Shuzenji, Japan, July 9-11, 2014
47. 金井駿、
 “金属磁性の電界制御とその応用、”
 東北大学電気通信研究所平成26年度研究交流会、東北大学電気通信研究所、平成26年8月26日
48. 大野英男、
 “最先端研究開発支援プログラム(FIRST)「省エネルギー・スピントロニクス論理集積回路の研究開発」での論理集積回路研究について、” (招待) , 東京、平成26年8月28日
49. 金井駿、辻川雅人、山ノ内路彦、池田正二、三浦良雄、白井正文、松倉文礼、大野英男、
 “Magnetic anisotropy in Ta/CoFeB/MgO investigated by x-ray magnetic circular dichroism and first-principles calculation,” (oral),
 第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
50. 佐藤英夫、エライエノビオ、山ノ内路彦、池田正二、深見俊輔、松倉文礼、大野英男、
 “Junction size dependence of intrinsic critical current and thermal stability factor of MgO/CoFeB/Ta/CoFeB/MgO recording structure,” (oral),
 第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
51. 平山絵里子、金井駿、佐藤英夫、松倉文礼、大野英男、
 “In-plane anisotropy in a CoFeB-MgO magnetic tunnel junction detected by

- magnetoresistance,” (oral),
第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
52. 青木あすか、好田誠、石原淳、大野裕三、松倉文礼、大野英男、新田淳作、
“Modulation of spin precession frequency by spin relaxation anisotropy in a (110) GaAs/AlGaAs quantum wall,” (oral),
第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
53. 深見俊輔、山ノ内路彦、池田正二、大野英男、
“Thermal stability and critical current for domain wall motion in nanowire, “ (invited, Young Scientist Oral Presentation Award Speech),
第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
54. 張超亮、深見俊輔、佐藤英夫、山ノ内路彦、松倉文礼、大野英男、
“Device size dependence of magnetization switching by spin-orbit torque in Ta/CoFeB/MgO structure,” (oral),
第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
55. S. DuttaGupta, S. Fukami, M. Yamanouchi, C. Zhang, H. Sato, F. Matsukura, and H. Ohno,
“Current and field induced domain wall creep in Ta/CoFeB/MgO/Ta wire,” (oral) ,
第75回応用物理学会秋季学術講演会、北海道大学、平成26年9月17日-20日
56. 大野英男、
「スピントロニクス-電界制御と界面効果を中心に-」(招待)、
新学術領域「超低速ミュオン顕微鏡が拓く物質・生命・素粒子科学のフロンティア」
領域会議、仙台、平成26年9月23日～24日
57. 大野英男、
「ナノデバイス科学からの期待」、(招待)、
日本学術会議公開シンポジウム「中型高輝度放射光源に期待するこれからの科学技術」、東京、平成26年10月31日
58. 大野英男、
「微細スピントロニクス素子」、(口頭)、
平成26年度東北大学電気通信研究所共同プロジェクト研究会「非平衡スピン・ゆらぎの精緻な制御と観測による新規ナノデバイスの開拓研究」、仙台、平成26年11月13日-14日
59. E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“Size Dependence of Magnetic Properties of Nanoscale CoFeB/MgO Magnetic Tunnel Junctions”, (oral),
応用物理学会東北支部大会Student Chapter, 東北大学、仙台、平成26年12月2日
60. Y. Takeuchi, S. Ishikawa, H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno,
“Temperature Dependence of Thermal Stability Factor of CoFeB-MgO Perpendicular-Anisotropy,” (oral),
応用物理学会東北支部大会Student Chapter, 東北大学、仙台、平成26年12月2日
61. S. Ishikawa, H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno,
“Magnetic Tunnel Junctions with CoFeB/Ta/[Co/Pt] Multilayer Ferromagnetic Electrode,” (oral),
応用物理学会東北支部大会Student Chapter, 東北大学、仙台、平成26年12月2日

62. 姉川哲朗、張超亮、深見俊輔、大野英男
「面内磁化容易3端子スピン軌道トルク素子の反転電流」(口頭)、
第69回応用物理学会東北支部学術講演会、東北大学、仙台、平成26年12月4日～5日
63. 中山裕康、Lin Chen, Hsiao Wen Chang, 松倉文礼、大野英男、
「Pt/(Ga,Mn)As構造における強磁性共鳴下の直流電圧信号」(口頭)、
第69回応用物理学会東北支部学術講演会、東北大学、仙台、平成26年12月4日～5日
64. 渡部杏太、石川慎也、佐藤英夫、池田正二、深見俊輔、松倉文礼、大野英男、
「MgO/CoFeB/Ta積層膜の磁気特性のCoFeBおよびTa膜厚依存性」(口頭)、
第69回応用物理学会東北支部学術講演会、東北大学、仙台、平成26年12月4日～5日
65. E. Hirayama, S. Kanai, H. Sato, F. Matsukura, H. Ohno,
“Properties of Nanoscale Magnets Investigated by Homodyne-Detected Ferromagnetic Resonance,”
8th High-Tech Research Center Symposium, “New Frontiers in Functional Materials”, Toho University, Funabashi, Dec. 6, 2014
66. 大野英男、松倉文礼、
「ナノデバイス科学からの放射光への期待」、(招待)、
東北大学金属材料研究所共同利用ワークショップ「3GeV中型高輝度放射光(SLiT-J)の実現に向けて」、東北大学、仙台、平成26年12月15日～16日
67. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,”
Temperature dependence of in-plane magnetic anisotropy in (Ga,Mn)As codoped with Li,”
(poster),
19th Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-19),
Tokyo, Japan, December 15-16, 2014
68. H. Nakayama, L. Chen, H. W. Chang, F. Matsukura, and H. Ohno,
“DC voltages in Pt/(Ga,Mn)As under ferromagnetic resonance,” (oral),
19th Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-19),
Tokyo, Japan, December 15-16, 2014
69. T. Hanyu, D. Suzuki, A. Mochizuki, M. Natsui, N. Onizawa, T. Sugibayashi, S. Ikeda, T. Endoh, and H. Ohno,
“Challenge of MOS/MTJ-Hybrid Nonvolatile Logic-in Memory Architecture in Dark-Silicon Era,” (invited),
2014 International Electron Devices Meeting (IEDM), San Francisco, U. S. A., December 15-17, 2014
70. 大野英男
「東北大学におけるスピントロニクス」、(招待)、
東北大学電気通信研究所共同プロジェクト研究S「スピントロニクス学術研究基礎と連携ネットワーク構築に向けて」、東京大学、平成26年12月17日
71. 小池洋紀、池田正二、羽生貴弘、大野英男、遠藤哲郎、
「磁気ランダムアクセスメモリ(MRAM)の最新技術動向」、(口頭)、
第60回CVD研究会、京都、平成26年12月18日
72. 大野英男、
「先端スピントロニクス素子・材料のブレークスルーと評価技術」、(招待)、
SPRUC分野融合型研究ワークショップ「新たな分野融合型研究の開拓に向けて」、東京、平成27年2月19日

73. 成田克、早尾貴史、高橋豊、伊藤正俊、酒見泰寛、小林大輔、廣瀬和之、石川慎也、Enobio Eli Christopher、佐藤英夫、池田正二、遠藤哲郎、大野英男、
「垂直磁気異方性CoFeB-MgO磁気トンネル接合の高速中性子耐性評価」(ポスター)、
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
74. 姉川哲朗、張超亮、深見俊輔、大野英男、
「新規3端子スピン軌道トルク素子の動作実証」、(ポスター)
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
75. 竹内祐太郎、エノビオエライクリストファー、佐藤英夫、深見俊輔、池田正二、松倉文礼、大野英男、
「垂直磁気異方性CoFeB-MgO磁気トンネル接合における閾値電流の温度依存性」、(口頭)
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
76. 金井駿、Gajek Martin, Worledge Daniel, 松倉文礼、大野英男、
“dc Bias Voltage Dependence of Magnetic Anisotropy in CoFeB/MgO Investigated by Electric Field-Induced Ferromagnetic Resonance,” (口頭)、
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
77. 大野英男、
「AllInAs/GaInAsから強磁性半導体GaMnAsまで」(招待：第5回化合物半導体エレクトロニクス業績賞(赤崎勇賞)受賞記念講演)、
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
78. S. DuttaGupta, S. Fukami, C. L. Zhang, H. Sato, M. Yamanouchi, F. Matsukura, and H. Ohno,
“Universality Classes for Current-and Field-Induced Domain Wall Creep in a Ta/CoFeB/MgO/Ta Wire, (oral),
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
79. C. Zhang, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
“Device size Dependence of Switching Current for Magnetization Reversal Induced by Spin-Orbit Torque in Ta/CoFeB/MgO Structures Down to 30nm,” (oral),
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
80. H. Nakayama, L. Chen, H. W. Chang, F. Matsukura, and H. Ohno,
“Ferromagnetic Resonance Induced Electrical Signals in Pt/(Ga,Mn)As, (oral),
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
81. E. Hirayama, S. Kanai, J. Ohe, H. Sato, F. Matsukura, and H. Ohno,
“rf Power Dependence of Homodyne-Detected Ferromagnetic Resonance Spectra of a CoFeB/MgO Magnetic Tunnel Junction,” (oral),
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
82. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
“Temperature Dependent Direction of in-plane Uniaxial Magnetic Anisotropy in (Ga,Mn)As Codoped with Li,” (oral),
第62回応用物理学会学術講演会、東海大学、平塚、平成27年3月11日～14日
83. H. Ohno,
“Spintronics Devices for Integrated Circuits – An Overview,” (invited),
1st CIES Technology Forum, Tokyo, Japan, March 19, 2015
84. 平松亮、K. K.Jin、谷口卓也、東野隆之、森山貴広、深見俊輔、山ノ内路彦、大野英男、仲谷栄伸、小野輝男、

「磁場および電流によって制御された磁壁発信器」、(口頭)、
第70回日本物理学会春季年次大会、早稲田大学、日本、平成27年3月21日～24日

85. 羽生貴弘、鈴木大輔、望月明、夏井雅典、鬼沢直哉、杉林直彦、池田正二、遠藤哲郎、大野英男、
「不揮発ロジックインメモリアーキテクチャとその低電力VLSIシステムへの応用」
(チュートリアル)、
電子情報通信学会・集積回路研究会、信州大学、日本、平成27年4月17日
86. 金井駿、仲谷栄伸、岡田篤、松倉文礼、大野英男
「強磁性薄膜における電界効果と磁気ダイナミクス」(口頭)、
第54回スピントロニクス専門研究会「スピンの電界制御の現状と将来展望」、中央大
学、平成27年6月10日
87. T. Iwabuchi, S. Fukami, and H. Ohno,
“Width Dependence of Threshold Current Density for Domain Wall Motion in Co/Ni Wire,”
(ポスター)、
第34回電子材料シンポジウム、守山市、平成27年7月15日-17日
88. N. Ohshima, S. Kubota, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Junction Size Dependence of Switching Current in CoFeB-MgO Magnetic Tunnel Junctions
with Perpendicular Easy Axis,” (ポスター)、
第34回電子材料シンポジウム、守山市、平成27年7月15日-17日
89. 岡田篤、
「電界による強磁性金属薄膜の磁気特性の変調」(口頭)、
平成27年度ナノ・スピン実験施設研究発表会、仙台、平成27年7月23日
90. 都澤章平、
「ドナー共添加が強磁性半導体の諸特性に与える影響」、(口頭)、
平成27年度ナノ・スピン実験施設研究発表会、仙台、平成27年7月23日
91. 平山絵里子、
「磁化ダイナミクスを利用したナノ磁性体の特性評価」、(口頭)
平成27年度ナノ・スピン実験施設研究発表会、仙台、平成27年7月23日
92. T. Iwabuchi, S. Fukami, and H. Ohno,
“Wire Width Dependence of Current-Induced Domain Wall Motion Properties,” (口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～
16日
93. T. Anekawa, C. Zhang, S. Fukami, and H. Ohno,
“Pulse Width Dependence of a Spin-Orbit Torque Induced Magnetization Switching,” (口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～
16日
94. E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“In-Plane Aspect Ratio Dependence of Thermal Stability and Intrinsic Critical Current in
CoFeB/MgO Magnetic Tunnel Junctions with Perpendicular Anisotropy,” (口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～
16日
95. A. Okada, Y. Hashimoto, S. Kanai, F. Matsukura, and H. Ohno,
“CoFeB Thickness Dependence of Electric-Field Effects on Magnetic Anisotropy and
Damping Constant in Ta/CoFeB/MgO Structures,” (口頭)、

第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日

96. S. Fukami, C. Zhang, S. DuttaGupta, and H. Ohno,
“Spin-Orbit Torque Induced Switching in an Antiferromagnet/Ferromagnet Heterostructure,”
(口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日
97. S. Miyakozawa, L. Chen, F. Matsukura, and H. Ohno,
“Temperature Dependence of In-Plane Anisotropic Magnetoresistance in (Ga, Ma)As:Li,” (口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日
98. N. Ohshima, S. Kubota, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Switching Characteristics of CoFeB-MgO Magnetic Tunnel Junctions in the ns Regime,” (口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日
99. C. Zhang, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
“Magnetization Reversal Induced by Spin-Orbit Torque in a Nanoscale Ta/CoFeB/MgO Dot,”
(口頭)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日
100. 成田克、高橋豊、原田正英、大井元貴、及川健一、小林大輔、廣瀬和之、石川慎也、
E. C. I. Enobio、佐藤英夫、池田正二、遠藤哲郎、大野英男、
「垂直磁気異方性CoFeB-MgO磁気トンネル接合の高速中性子耐性評価 (II)」(ポスター)、
第76回応用物理学会秋季学術講演会、名古屋国際会議場、日本、平成27年9月13日～16日
101. 金井駿、
「磁気異方性の電界制御とその応用」(招待)、
日本物理学会2015年秋季大会、関西大学、日本、平成27年9月16日～19日
102. 大野英男、
「スピントロニクスによる集積回路の革新」、(特別講演)、
静岡大学工学研究所50周年記念式典、静岡大学、平成27年11月16日
103. 金井駿、仲谷栄伸、岡田篤、佐藤英夫、松倉文礼、大野英男、
「強磁性体の電界制御とその記録素子応用」(招待)、
第20回スピン工学の基礎と応用 (PASPS-20)、仙台日本、平成27年12月3日～4日
104. 岡田篤、橋本祥斉、金井駿、松倉文礼、大野英男、
「Ta/CoFeB/MgO構造における磁気異方性とダンピング定数の電氣的制御」、(口頭)、
第20回スピン工学の基礎と応用 (PASPS-20)、仙台、日本、平成27年12月3日～4日
105. C. Zhang, S. Fukami, H. Sato, F. Matsukura, and H. Ohno,
“Magnetization Switching in Ta/CoFeB/MgO Nanodot Driven by Spin-Orbit Torque,” (oral),
第20回スピン工学の基礎と応用 (PASPS-20)、仙台、日本、平成27年12月3日～4日
106. 平山絵里子、金井駿、大江純一郎、佐藤英夫、松倉文礼、大野英男、
「CoFeB/MgO垂直磁化容易磁気トンネル接合における電界誘起非線形強磁性共鳴」、

(口頭)、
第20回スピ工学の基礎と応用 (PASPS-20)、仙台日本、平成27年12月3日～4日

107. E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura, and H. Ohno,
“Perpendicular Anisotropy and Damping Constant of Single and Double CoFeB-MgO Interface Structures with Various CoFeB Thicknesses,” (poster),
第20回スピ工学の基礎と応用 (PASPS-20)、仙台、日本、平成27年12月3日～4日
108. 都澤章平、陳林、松倉文礼、大野英男、
「(Ga,Mn)As:Liの面内異方性磁気抵抗効果の温度依存性」、(ポスター)、
第20回スピ工学の基礎と応用 (PASPS-20)、仙台、日本、平成27年12月3日～4日
109. 大野英男、
「スピントロニクス最前線-集積回路応用を中心に-」
電子デバイス界面テクノロジー研究会、三島、平成28年1月22日
110. 大野英男、
「実用スピントロニクス分野の動向」
第2回実用スピントロニクス新分野創成研究会、グランパークプラザ、東京、平成28年3月10日
111. 成田克、高橋豊、原田正英、大井元貴、及川健一、小林大輔、廣瀬和之、佐藤英夫、池田正二、遠藤哲郎、大野英男、
「垂直磁気異方性CoFeB-MgO磁気トンネル接合の高速中性子耐性評価(III)」、(ポスター)、
第63回応用物理学会春季学術講演会、東京工業大学、平成28年3月19日～22日
112. T. Dohi, S. Kanai, A. Okada, S. Fukami, F. Matsukura, and H. Ohno,
“Electric-field effect on domain structure in MgO/CoFeB/Ta,” (oral), (ポスター)、
第63回応用物理学会春季学術講演会、東京工業大学、平成28年3月19日～22日
113. C. Zhang, S. Fukami, S. DuttaGupta, H. Sato, F. Matsukura, and H. Ohno,
“Spin-orbit torque induced magnetization switching in W/CoFeB/MgO,”(oral), (ポスター)、
第63回応用物理学会春季学術講演会、東京工業大学、平成28年3月19日～22日
114. A. Kurenkov, C. Zhang, S. Fukami, S. DuttaGupta, and H. Ohno,
“Dot size dependence of magnetization switching by spin-orbit torque in antiferromagnet/ferromagnet structures,” (oral), (ポスター)、
第63回応用物理学会春季学術講演会、東京工業大学、平成28年3月19日～22日
115. 大野英男、
「大学のグローバル化 -東北大学の取組みを中心に-」、(招待)、
分子科学研究所所長招聘会議、岡崎コンファレンスセンター、平成28年5月13日
116. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
“Damping constant in a nanoscale magnetic tunnel junction evaluated by homodyne-detected ferromagnetic resonance,” (oral),
35th Electronic Materials Symposium, Moriyama, Japan, July 6-8, 2016
117. J. Igarashi, E. C. I. Enobio, H. Sato, S. Fukami, F. Matsukura and H. Ohno,
“Magnetic field angle dependence of switching field in CoFeB-MgO magnetic tunnel junction with perpendicular easy axis,” (oral),
35th Electronic Materials Symposium, Moriyama, Japan, July 6-8, 2016

118. A. Ohkawara, T. Anekawa, C. Zhang, S. Fukami, and H. Ohno,
 “Spin-orbit torque induced switching in three-terminal devices with a Ta/W channel,” (oral),
 35th Electronic Materials Symposium, Moriyama, Japan, July 6-8, 2016
119. 深見俊輔、姉川哲朗、大河原綾人、張超亮、大野英男、
 「3端子スピン軌道トルク磁気メモリ素子」、(招待)、
 電子情報通信学会情報センシング研究会 (ITE-IST)、中央電気倶楽部 (大阪)、平成
 28年8月1日～3日
120. H. Ohno,
 “Spintronics devices for nonvolatile VLSI,”
 40th Annual Conference on Magnetism in Japan, Kanazawa, Japan, September 5-8, 2016
121. T. Endoh, H. Koike, Y. Ma, T. Hanyu, S. Ikeda, and H. Ohno,
 “Low-power NV-working memory and NV-logic with spintronics/CMOS hybrid ULSI
 technology,” (invited),
 40th Annual Conference on Magnetism in Japan, Kanazawa, Japan, September 5-8, 2016
122. S. Fukami, C. Zhang, S. DuttaGupta, A. Kurenkov, T. Anekawa, A. Ohkawara, and H. Ohno,
 “Three-terminal spintronics devices with spin-orbit torque induced switching for ultra-low
 power and high-performance integrated circuits,” (invited),
 40th Annual Conference on Magnetism in Japan, Kanazawa, Japan, September 5-8, 2016
123. 渡部杏太、深見俊輔、佐藤英夫、松倉文礼、大野英男、
 「CoFeB-MgOの磁気特性の隣接層材料依存性」(口頭)
 40th Annual Conference on Magnetism in Japan, Kanazawa, Japan, September 5-8, 2016
124. S. Kanai, F. Matsukura, H. Ohno,
 “Electric-field induced magnetization switching in CoFeB/MgO magnetic tunnel junction
 with thick MgO barrier,” (口頭)
 応用物理学会秋季学術講演会、朱鷺メッセ、平成28年9月13日～16日
125. K. M. Watanabe, S. Fukami, H. Sato, F. Matsukura and H. Ohno,
 “Dependence of switching properties of CoFeB-MgO based magnetic tunnel junctions on
 insertion layer material,” (口頭)
 応用物理学会秋季学術講演会、朱鷺メッセ、平成28年9月13日～16日
126. C. Zhang, S. Fukami, K. Watanabe, A. Ohkawara, S. DuttaGupta, H. Sato, F. Matsukura and
 H. Ohno,
 “Sputtering condition dependence of spin-orbit torque induced magnetization reversal in
 W/CoFeB/MgO heterostructure,” (口頭)
 応用物理学会秋季学術講演会、朱鷺メッセ、平成28年9月13日～16日
127. 成田克、高橋豊、原田正英、大井元貴、及川健一、小林大輔、廣瀬和之、佐藤英夫、
 池田正二、遠藤哲郎、大野英男、
 「垂直磁気異方性CoFeB-MgO磁気トンネル接合の高速中性子耐性評価」(口頭)
 応用物理学会秋季学術講演会、朱鷺メッセ、平成28年9月13日～16日
128. 相馬清吾、L Chen、R. Oszwaldowski、佐藤宇史、松倉文礼、T. Dietl、大野英男、高橋
 隆、
 「In-situ高分解能ARPESでみる(Ga,Mn)Asの価電子帯電子状態」(口頭)
 応用物理学会秋季学術講演会、朱鷺メッセ、平成28年9月13日～16日
129. 大野英男、
 「強磁性物質におけるスピンの電氣的制御と素子応用に関する先導的研究」、(招待)、
 江崎玲於奈賞受賞講演会、つくば、平成28年11月22日

130. 深見俊輔、大野英男、
「スピントロニクス技術に関する先駆的・先導的研究への貢献」、
平成28年度東北大学電気通信研究所共同プロジェクト研究会「電荷とスピンの制御に
基づく精密物性科学の構築とデバイス応用」、仙台、平成28年11月23日～24日
131. 大野英男、
「スピントロニクス技術に関する先駆的・先導的研究への貢献」、
C&C賞受賞記念講演会、東京、平成28年11月30日
132. 市川直樹、土肥昂堯、金井駿、岡田篤、松倉文礼、大野英男、
「Ta/CoFeB/MgO接合の交換スティブネス定数の膜厚依存性」(口頭)、
応用物理学会東北支部第71回学術講演会、東北大学、仙台、平成28年12月1日～2日
133. W. A. Borders, S. Fukami, and H. Ohno,
“Stack structure dependence of magnetic properties of PtMn/[Co/Ni] films for spin-orbit
torque switching,” (oral),
応用物理学会東北支部第71回学術講演会、東北大学、仙台、平成28年12月1日～2日
134. S. Souma, L. Chen, R. Oszwaldowski, T. Sato, F. Matsukura, T. Dietl, H. Ohno and T.
Takahashi,
“Fermi-level position in (Ga,Mn)As,” (口頭)、
第21回スピン工学の基礎と応用 (PASPS21)、北海道大学、平成28年12月12-13日
135. M. Shinozaki, E. Hirayama, S. Kanai, H. Sato, F. Matsukura and H. Ohno,
“Damping constant in nanoscale CoFeB/MgO magnetic tunnel junctions investigated by
homodyne-detected ferromagnetic resonance, (poster),
平成28年度スピン変換年次報告会、東京、平成29年3月2日～3日
136. 大野英男、
「電気通信研究所における最近の研究—Beyond big dataからスピントロニクスまで
—」(招待)、
日本工学アカデミー北海道・東北支部講演会、仙台、平成29年3月9日
137. 土肥昂堯、金井駿、松倉文礼、大野英男、
“Electric-field effect on stiffness constant investigated by spin-wave resonance in nanoscale
MgO/CoFeB magnetic tunnel junctions,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
138. 金井駿、佐藤英夫、仲谷栄伸、松倉文礼、大野英男、
“Thermal fluctuation in electric-field induced magnetization switching in CoFeB/MgO
magnetic tunnel junctions observed by transmitted voltage,” (poster),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
139. A. Kurenkov, S. DuttaGupta, C. Zhang, W. Borders, S. Fukami, and H. Ohno,
“Spin-orbit torque memristor, operated pulsed currents,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
140. 大島直樹、佐藤英夫、金井駿、深見俊輔、J. Llandro、松倉文礼、大野英男、
“Time-resolved measurement of spin-transfer-torque-induced magnetization switching in
CoFeB-MgO magnetic tunnel junctions with perpendicular easy axis,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日

141. 陣内佛霖、張超亮、A. Kurenkov、M. Bersweiler、佐藤英夫、深見俊輔、大野英男、
“Spin-orbit torque induced magnetization switching in Co/Pt multilayers,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
142. 篠崎基矢、平山絵里子、金井駿、佐藤英夫、松倉文礼、大野英男、
“Junction size dependence of damping constants in nanoscale CoFeB/MgO magnetic tunnel
junctions,” (poster),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
143. 市川直樹、土肥昂堯、金井駿、岡田篤、松倉文礼、大野英男、
“CoFeB thickness dependence of exchange stiffness constants in Ta/CoFeB/MgO determined
from domain structures,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
144. 五十嵐純太、エノビオエライ、リアンドロジャスティン、佐藤英夫、深見俊輔、松倉
文礼、大野英男、
“Magnetic-field-angle dependence of coercivity in a nanoscale CoFeB-MgO magnetic tunnel
junction with perpendicular easy axis at various temperatures,” (poster),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
145. W. A. Borders, H. Akima, S. Fukami, S. Moriya, S. Kurihara, A. Kurenkov, Y. Horio, S. Sato,
and H. Ohno,
“An analogue spin-orbit torque device for an artificial neural network,” (oral),
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
146. 成田克、高橋豊、原田正英、及川健一、大井元貴、小林大輔、廣瀬和之、佐藤英夫、
池田正二、遠藤哲郎、大野英男、
「2重CoFeB-MgO界面構造を記録層に持つ垂直磁気異方性磁気トンネル接合の高速中
性子耐性評価」、(ポスター)、
第64回応用物理学会春季学術講演会、パシフィコ横浜、平成29年3月14日～17日
147. 相馬清吾、L. Chen、R. Oszwa dowski、佐藤宇史、松倉文礼、T. Dietl、大野英男、高橋
隆、
「希薄磁性半導体(Ga,Mn)AsのARPESにおける磁気線二色性」、(口頭)、
第72回日本物理学会春季大会、大阪大学、平成29年3月17日～20日
148. H. Honjo, S. Ikeda, H. Sato, K. Nishioka, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M.
Yasuhira, T. Tanigawa, H. Inoue, H. Koike, M. Muraguchi, M. Niwa, K. Ito, K. Nishioka, H.
Ohno, and T. Endoh,
“Material development in advanced STT-MRAM for non-volatile VLSI,” (invited),
3rd CIES Technology Forum, Tokyo, Japan, March 21, 2017
149. 秋間学尚、W. Borders、深見俊輔、守谷哲、栗原祥太、A. Kurenkov、下橋亮太、堀尾
喜彦、佐藤茂雄、大野英男、
「スピン軌道トルク磁気メモリデバイスを用いた自己連想記憶」、(口頭)、
2017年電子情報通信学会総合大会、名城大学、平成29年3月22日～25日
150. 大野英男「スピントロニクス –III-V族磁性半導体の創成から集積回路応用まで-」、
(招待)、第4回京都大学・稲盛財団合同京都賞シンポジウム、京都、平成29年7月2日
151. 五十嵐純太、リアンドロ ジャスティン、佐藤英夫、深見俊輔、大野英男、
「垂直磁化容易軸を有するCoFeB/MgO磁気トンネル接合における低温下でのスイッ
チング電流の印可磁界依存性」(口頭)、
第78回応用物理学会秋季学術講演会、福岡国際会議場、平成29年9月5日～8日

152. S. DuttaGupta, C. Zhang, S. Fukami, and H. Ohno,
 “Quantification of Dzyaloshinskii-Moriya interaction from thermally-activated and flow regime domain wall motion, (oral),
 第78回応用物理学会秋季学術講演会、福岡国際会議場、平成29年9月5日～8日
153. W. A. Borders, H. Akima, S. Fukami, S. Moriya, S. Kurihara, A. Kurenkov, Y. Horio, S. Sato, and H. Ohno,
 “Characterizing analogue spin-orbit torque devices for artificial neural networks,” (oral),
 第78回応用物理学会秋季学術講演会、福岡国際会議場、平成29年9月5日～8日
154. S. Fukami, A. Kurenkov, W. A. Borders, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Spin-orbit torque induced switching using antiferromagnets and its application to artificial neural network,” (oral),
 第41回日本磁気学会学術講演会 Symposium “Controlling magnetization by applying electric current and voltage”、九州大学、平成29年9月19日～22日
155. 大野英男、
 「スピントロニクス素子研究：材料からデバイスへ」(招待)、
 平成29年度磁性材料研究会、東京、平成29年10月12日
156. 深見俊輔、
 「アナログスピンメモリ素子とその人工知能応用」(口頭)、
 平成29年度東北大学電気通信研究所共同プロジェクト研究会「電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用」、仙台、平成29年11月2日～3日
157. Y. Takahashi, A. Ohkawara, T. Anekawa, C. Zhang, S. Fukami, and H. Ohno,
 “In-plane easy axis angle dependence of spin-orbit torque induced magnetization switching,” (口頭)、
 第36回電子材料シンポジウム (EMS)、長浜、平成29年11月8日～10日
158. T. Saino, H. Sato, S. Fukami, and H. Ohno,
 “An effect of junction diameter on write-error rate of CoFeB/MgO-based magnetic tunnel junction with perpendicular easy axis,” (口頭)、
 第36回電子材料シンポジウム (EMS)、長浜、平成29年11月8日～10日
159. Z. Wang, M. Shinozaki, A. Okada, S. Kanai, H. Sato, F. Matsukura, and H. Ohno,
 “Homodyne-detected ferromagnetic resonance in nanoscale magnetic tunnel junction with magnetic field modulation,” (口頭)、
 第36回電子材料シンポジウム (EMS)、長浜、平成29年11月8日～10日
160. R. Itoh, R. Iguchi, S. Daimon, K. Oyanagi, K. Uchida, and E. Saitoh,
 “Suppression of spin Peltier effect under high magnetic fields,” (口頭)、
 第36回電子材料シンポジウム (EMS)、長浜、平成29年11月8日～10日
161. 深見俊輔、W. A. Borders、A. Kurenkov、張超亮、S. DuttaGupta、大野英男、
 「反強磁性/強磁性ヘテロ構造における スピン軌道トルク磁化反転と人工神経回路網応用」、(招待)、
 応用物理学会スピントロニクス研究会日本磁気学会スピントロニクス専門研究会共同主催研究会「反強磁性スピントロニクスの新展開」、東京、平成29年11月22日
162. 岡田篤、S. He、顧波、金井駿、A. Soumyanarayanan、S.T. Lim、M. Tran、森道康、前川禎通、松倉文礼、大野英男、C. Panagopoulos、
 “Temperature and CoFeB thickness dependence of linewidth of ferromagnetic resonance in thin CoFeB Films,” (口頭)、
 応用物理学会東北支部第72回学術講演会、秋田大学、平成29年11月30日～12月1日

163. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno
「アナログスピントロニクスメモリを用いた人工神経回路網」(招待)、
東北大学電気通信研究所 共同プロジェクト研究会「新規固体デバイス・回路を用いた脳型コンピューティングに関する研究」、東北大学、平成29年12月26日
164. 大野英男、
「不揮発スピントロニクス素子と省エネ集積回路」、
文部科学省表彰受賞記念講演会、日立製作所、平成30年1月11日
165. 深見俊輔、W. A. Borders、A. Kurenkov、張超亮、S. DuttaGupta、大野英男、
「Spin-orbit torque devices for artificial neural networks,」(招待)、
日本磁気学会第216回研究会、第66回スピントロニクス専門研究会「ニューロモフリックスピントロニクス」、東京、平成30年1月25日
166. 大野英男、
「超微細スピントロニクス素子とその集積回路、AI応用」、(基調)、
第16回ナノテクノロジー総合シンポジウム、東京、平成30年2月16日
167. 大野英男、
「極微細磁気トンネル接合」(口頭)、
スピントロニクス学術研究基盤と連携ネットワークシンポジウム、東京、平成30年3月1日
168. 深見俊輔、C. Zhang、W. A. Borders、陣内佛霖、A. Kurenkov、S. DuttaGupta、佐藤英夫、大野英男、
「スピン軌道トルク磁化反転とその応用」(ポスター)、スピントロニクス学術研究基盤と連携ネットワークシンポジウム、東京、平成30年3月1日
169. S. Gupta、金井駿、松倉文礼、大野英男、
「(Bi, Sb)₂Te₃上のパーマロイの強磁性共鳴」(ポスター)、
スピントロニクス学術研究基盤と連携ネットワークシンポジウム、東京、平成30年3月1日
170. 羽生貴弘、鈴木大輔、鬼沢直哉、夏井雅典、遠藤哲郎、大野英男、
「スピントロニクスが拓く新しいロジックLSIの展望」(ポスター)、
スピントロニクス学術研究基盤と連携ネットワークシンポジウム、東京、平成30年3月1日
171. 大野英男、
「スピントロニクス不揮発性素子」、(招待)、
科学協力学術センター第39回市民型講座、仙台、平成30年3月6日
172. B. Jinnai, H. Sato, S. Fukami, and H. Ohno,
“Spin-orbit torque switching and thermal stability of nanoscale Co/Pt multilayers over a wide range of temperature,” (poster),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
173. A. Okada, S. Kanai, S. Fukami, H. Sato, and H. Ohno,
“An effect of electric field on a cone angle at an easy-cone state in CoFeB/MgO stack investigated by ferromagnetic resonance,” (oral),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
174. M. Shinozaki, J. Igarashi, H. Sato, and H. Ohno,
“Free-layer size dependence of magnetic anisotropy in nanoscale CoFeB/MgO magnetic

- tunnel junctions,” (poster),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
175. T. Saino, H. Sato, S. Fukami, and H. Ohno,
“Write-error rate of perpendicular-anisotropy CoFeB/MgO-based magnetic tunnel junction with different junction diameters,” (oral)
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
176. N. Ichikawa, T. Dohi, A. Okada, H. Sato, S. Fukami, and H. Ohno,
“Non-linear behavior of electric-field effect on domain period in Ta/CoFeB/MgO,” (poster),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
177. R. Itoh, Y. Takeuchi, S. DuttaGupta, S. Fukami, and H. Ohno,
“Extend harmonic Hall measurement of spin-orbit torque efficiencies in antiferromagnet/ferromagnet heterostructures,” (oral),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
178. S. DuttaGupta, T. Kanemura, R. Itoh, A. Kurenkov, C. Zhang, S. Fukami, and H. Ohno,
“Dzyaloshinskii-Moriya interaction in an antiferromagnet/ferromagnet heterostructure,” (oral),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
179. S. DuttaGupta, A. Kurenkov, R. Itoh, C. Zhang, S. Fukami, and H. Ohno,
“Magnetoresistance in a nonmagnet/antiferromagnet metallic heterostructure,” (oral)
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
180. Y. Takahashi, Y. Takeuchi, C. Zhang, B. Jinnai, S. Fukami, and H. Ohno,
“Measurement of spin-orbit torque switching in in-plane nanomagnet array using planar Hall geometry,” (oral),
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
181. 深見俊輔、ボーダーズウィリアム、クレンコフアレクサンダー、張超亮、ダッタグプ
タサミック、大野英男、
「アナログスピンメモリ素子を用いた人工神経回路網」、(口頭)、
第65回応用物理学会春季学術講演会、早稲田大学、平成30年3月17日～20日
182. W. A. Borders, S. Fukami, and H. Ohno,
“Analog spin-orbit torque switching for neuromorphic application (Invited),” (invited)
第42回日本磁気学会学術講演会、日本大学理工学部駿河台キャンパス、東京、
2018/09/11-2018/09/14.
183. C. Zhang, Y. Takeuchi, Y. Takahashi, S. Fukami, and H. Ohno,
“Magnetization switching combining spin-orbit torque and spin-transfer torque,” (oral)
第79回応用物理学会秋季学術講演会、名古屋国際会議場、名古屋、
2018/09/18-2018/09/21.
184. 大野英男,
“スピントロニクスと産学連携,” (invited)
第46回日本放射線技術学会秋季学術大会、仙台、東京、2018/10/04-2018/10/06.
185. 深見俊輔、大野英男,
“反強磁性/強磁性積層構造におけるスピン軌道トルク磁化反転,” (invited)
第1回ナノスピン研究会「放射光を用いたナノスピン材料科学の新展開」、東北大学、
仙台、2018/10/05.
186. Z. Wang, M. Shinozaki, A. Okada, M. Bersweiler, S. Kanai, H. Sato, S. Fukami and H. Ohno,
“Homodyne-detected ferromagnetic resonance in nanoscale MgO/FeB/MgO magnetic tunnel
junction,” (poster)

第37回電子材料シンポジウム, ホテル&リゾート長浜、滋賀県長浜市,
2018/10/10-2018/10/12

187. T. Koga, K. Watanabe, W. A. Borders, S. Fukami and H. Ohno,
“Stack structure dependence of magnetic properties of granular films for spintronics device applications,” (poster)
第37回電子材料シンポジウム, ホテル&リゾート長浜、滋賀県長浜市,
2018/10/10-2018/10/12
188. T. Funatsu, J. Igarashi, K. Watanabe, S. Fukami, H. Sato and H. Ohno,
“Magnetic coupling of perpendicular easy axis FeB layers thorough MgO,” (poster)
第37回電子材料シンポジウム, ホテル&リゾート長浜、滋賀県長浜市,
2018/10/10-2018/10/12.
189. K. Furuya, Y. Takeuchi, Y. Takahashi, C. Zhang, A. Okada, B. Jinnai, S. Fukami and H. Ohno,
“Enhancement of spin-orbit torque efficiency in W/CoFeB/MgO by engineering W resistivity,”
(poster)
第37回電子材料シンポジウム, ホテル&リゾート長浜、滋賀県長浜市,
2018/10/10-2018/10/12.
190. K. Miyasaka, T. Saino, C. Zhang, S. Fukami and H. Ohno,
“Evaluation of write-error rate of spin-orbit torque induced magnetization switching,” (poster)
第37回電子材料シンポジウム, ホテル&リゾート長浜、滋賀県長浜市,
2018/10/10-2018/10/12.
191. 深見俊輔、大野英男,
“アナログスピン軌道トルク素子を用いた人工神経回路網,” (invited)
東京大学CSRN主催ワークショップ「スピン、ニューロモルフィック・コンピューティング」, 東京大学、東京、2018/10/27.
192. 深見俊輔,
“一桁ナノメートル磁気トンネル接合,” (invited)
平成30年度東北大学電気通信研究所共同プロジェクト研究会「電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用」, 仙台、2018/11/01-2018/11/02.
193. S. Kanai, Y. Nakatani, F. Matsukura, and H. Ohno,
“Electric-field Induced Magnetization Dynamics in a Nanoscale Magnetic Tunnel Junction,”
(poster)
One-Day Symposium on Spintronic Properties of Graphene and Related 2D Materials, 東京
大学柏の葉キャンパス駅前サテライト、千葉県柏市、2018/11/22.
194. 深見俊輔、大野英男,
“アナログスピントロニクス素子を用いた脳型情報処理,” (invited)
応用物理学会・量子エレクトロニクス研究会「量子エレクトロニクスによる未来型情報処理」, 上智大学軽井沢セミナーハウス、長野、2018/12/14-2018/12/16.
195. 深見俊輔,
“スピントロニクス素子の新機能創出,” (invited)
東北大学電気通信研究所 共同プロジェクト研究会「新規固体デバイス・回路を用いた脳型コンピューティングに関する研究」, 東北大学電気通信研究所、2019/01/15.
196. 深見俊輔、大野英男,
“不揮発性スピントロニクス素子技術 ― 大容量化、高速化、多機能化に向けた取り組み,” (invited)
日本学術振興会「先端ナノデバイス・材料テクノロジー第151委員会」平成30年度
第6回研究会, 東京大学本郷キャンパス工学部、2019/02/01.
197. 高橋佑, 竹内祐太朗, 張超亮, 陣内佛霖, 深見俊輔, 大野英男,
“プレーナーホール効果を用いた面内スピン軌道トルク素子の特性評価,” (invited)

第2回スピントロニクス学術研究基盤と連携ネットワークシンポジウム, 東北大学金属材料研究所, 2019/02/20.

198. S. Kanai, Y. Nakatani, F. Matsukura, and H. Ohno,
“Electric-field Induced Magnetization Dynamics in Nanoscale Magnetic Tunnel Junctions,” (poster)
Center for Nation-Wide Cooperative Research on ICT, FY 2018 RIEC Annual Meeting on Cooperative Research Projects "Compass for Next-Gen ICT", Sendai, Research Institute of Electrical Communication Tohoku University, 2019/02/21.
199. E. C. I. Enobio, S. Kanai, and S. Fukami,
“Coplanar waveguide size and sample size dependence of damping constant of CoFeB-MgO magnetic tunnel junction structure with perpendicular easy axis by vector-network-analyzer ferromagnetic resonance spectroscopy,” (poster)
Center for Nation-Wide Cooperative Research on ICT, FY 2018 RIEC Annual Meeting on Cooperative Research Projects "Compass for Next-Gen ICT", Sendai, Research Institute of Electrical Communication Tohoku University, 2019/02/21.
200. S. Sasaki, S. Fukami, T. Yuge, and Y. Hirayama,
“Low-frequency spectrum of local magnetic field fluctuation at As-nuclear-spin sites in bulk GaAs,” (poster)
Center for Nation-Wide Cooperative Research on ICT, FY 2018 RIEC Annual Meeting on Cooperative Research Projects "Compass for Next-Gen ICT", Sendai, Research Institute of Electrical Communication Tohoku University, 2019/02/21.
201. 深見俊輔,
“不揮発性スピントロニクス素子とその応用,” (invited)
東北大学電気通信研究所—早稲田大学ナノ・ライフ創新研究機構 共同プロジェクト研究(ナノエレクトロニクスに関する連携研究) 平成30年度研究会, 早稲田大学 理工学術院 (西早稲田キャンパス)、東京, 2019/02/26.
202. 古屋海渡、竹内祐太朗、張超亮、陣内佛霖、深見俊輔、大野英男,
“W/CoFeB/MgO ヘテロ構造におけるスピン軌道トルク,” (poster)
東北大学電気通信研究所—早稲田大学ナノ・ライフ創新研究機構 共同プロジェクト研究(ナノエレクトロニクスに関する連携研究) 平成30年度研究会, 早稲田大学 理工学術院 (西早稲田キャンパス)、東京, 2019/02/26.
203. 篠崎基矢、五十嵐純太、Justin Llandro、深見俊輔、佐藤英夫、大野英男,
“強磁性共鳴を用いたナノスケール磁気トンネル接合の特性評価,” (oral)
東北大学電気通信研究所—早稲田大学ナノ・ライフ創新研究機構 共同プロジェクト研究(ナノエレクトロニクスに関する連携研究) 平成30年度研究会, 早稲田大学 理工学術院 (西早稲田キャンパス)、東京, 2019/02/26.
204. K. Furuya, Y. Takeuchi, C. Zhang, B. Jinnai, Y. Takahashi, S. Fukami, and H. Ohno,
“Enhancement of spin-orbit torque in W/CoFeB/MgO by controlling W resistivity,” (poster)
第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.
205. T. Dohi, S. DuttaGupta, S. Fukami, and H. Ohno,
“Ferromagnetic layer thickness dependent domain wall chirality and sign of effective Dzyaloshinskii-Moriya field in W/(Co)FeB/MgO systems,” (oral)
第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.
206. A. Okada, Y. Takeuchi, K. Furuya, C. Zhang, H. Sato, S. Fukami, and H. Ohno,
“Determination of spin-orbit torque by spin-torque ferromagnetic resonance free from spin-pumping,” (oral)
第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.

207. R. Itoh, Y. Takeuchi, S. DuttaGupta, S. Fukami, and H. Ohno,
 “Temperature dependence of spin-orbit torques in an antiferromagnet/ferromagnet heterostructure,” (oral)
 第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.
208. A. Kurenkov, M. Baumgartner, G. Sala, G. Krishnaswamy, F. Maccherozzi, S. Fukami, P. Gambardella and H. Ohno,
 “Observation of memristive domain patterns during spin-orbit torque switching in antiferromagnet/ferromagnet heterostructures,” (oral)
 第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.
209. M. Shinozaki, T. Dohi, J. Igarashi, J. Llandro, S. Kanai, S. Fukami, H. Sato, and H. Ohno,
 “Edge state of nanoscale magnetic tunnel junctions investigated by spin-wave resonance,” (oral)
 第66回応用物理学会春季学術講演会, 東京工業大学 (大岡山キャンパス)、東京, 2019/03/09-2019/03/12.

(8) 著書 / Books

1. “Nanomagnetism and Spintronics: 7. III–V-Based Ferromagnetic Semiconductors (Elsevier)”
 Edited by Teruya Shinjo
 Publication date: 2013/10/7
 F. Matsukura and H. Ohno
2. In “Advances in Non-volatile Memory and Storage Technology (Woodhead Publishing Series in Electronic and Optical Materials)”
 Edited by Yoshio Nishi
 Publication date: 2014/6/26
 Chapter 15 “Spin-transfer-torque magnetoresistive random access memory (STT-MRAM) technology”
 H. Ohno, T. Endoh, T. Hanyu, Y. Ando and S. Ikeda

(9) 特許 / Patents

1. OHNO HIDEO, IKEDA SHOJI, MATSUKURA FUMIHIRO, ENDOH MASAKI, KANAI SHUN, MIURA KATSUYA, YAMAMOTO HIROYUKI,
 “MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”
 Publication number: US2013141966 (A1); US9135973 (B2), Publication date: 2013-06-06,
 Application number: US201113701257, Application date: 20110526
2. YAMAMOTO HIROKI, MORITA TADASHI, OHNO HIDEO, IKEDA SHOJI,
 “METHOD FOR PRODUCING TUNNELING MAGNETORESISTANCE ELEMENT,”
 Publication number: KR101487635 (B1); KR20130108418 (A), Publication date: 2013-10-02,
 Application number: KR20137015987, Application date: 20111220
3. SAKIMURA NOBORU, SUGIBAYASHI TADAHIKO, KOIKE HIROKI, ENDOH TETSUO,
 HANYU TAKAHIRO, OHNO HIDEO,
 “CIRCUIT DESIGN ASSISTANCE DEVICE, METHOD, AND PROGRAM,”
 Publication number: WO2014030490 (A1), Publication date: 2014-02-27,

Application number: WO2013JP70259, Application date: 20130719

4. SAKIMURA NOBORU, NEBASHI RYUSUKE, SUGIBAYASHI TADAHIKO, MATSUNAGA SHOUN, HANYU TAKAHIRO, OHNO HIDEO,
“NONVOLATILE CONTENT ADDRESSABLE MEMORY,”
Publication number: WO2014038341 (A1), Publication date: 2014-03-13,
Application number: WO2013JP71443, Application date: 20130801
5. SAKIMURA NOBORU, NEBASHI RYUSUKE, SUGIBAYASHI TADAHIKO, MATSUNAGA SHOUN, HANYU TAKAHIRO, OHNO HIDEO,
“FULL-TEXT SEARCH SYSTEM USING NON-VOLATILE CONTENT ADDRESSABLE MEMORY, AND TEXT STRING COMPARISON METHOD EMPLOYING SAME,”
Publication number: WO2014038306 (A1), Publication date: 2014-03-13,
Application number: WO2013JP70254, Application date: 20130719
6. FUKAMI SHUNSUKE, ISHIWATA NOBUYUKI, SUGIBAYASHI TADAHIKO, OHNO HIDEO, IKEDA SHOJI, YAMANOUCHI MICHIIHIKO,
“MAGNETIC MEMORY ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2014097509 (A1); US9799822 (B2), Publication date: 2014-04-10,
Application number: US201214118093, Application date: 20120419
7. HONJOU HIROAKI, FUKAMI SHUNSUKE, KINOSHITA KEIZO, OHNO HIDEO,
“SEMICONDUCTOR DEVICE AND METHOD FOR MANUFACTURING SAME,”
Publication number: WO2014168012 (A1), Publication date: 2014-10-16,
Application number: WO2014JP58703, Application date: 20140319
8. OHNO HIDEO, IKEDA SHOJI, YAMAMOTO HIROYUKI, KUROSAKI YOSUKE, MIURA KATSUYA,
“TUNNEL MAGNETORESISTIVE EFFECT ELEMENT AND RANDOM ACCESS MEMORY USING SAME,”
Publication number: US2014340961 (A1); US9153306 (B2), Publication date: 2014-11-20,
Application number: US201114356739, Application date: 20111108
9. ENDOH TETSUO, OHSAWA TAKASHI, KOIKE HIROKI, HANYU TAKAHIRO, OHNO HIDEO,
“INTEGRATED CIRCUIT,”
Publication number: KR20150006416 (A), Publication date: 2015-01-16,
Application number: KR20147021721, Application date: 20121204
10. SATO HIDEO, FUKAMI SHUNSUKE, YAMANOUCHI MICHIIHIKO, IKEDA SHOJI,

MATSUKURA FUMIHIRO, OHNO HIDEO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2015109853 (A1); US9202545 (B2), Publication date: 2015-04-23,
Application number: US201314390324, Application date: 20130325

11. NEBASHI RYUSUKE, SAKIMURA NOBORU, TSUJI YUKIHIRO, TADA AYUKA,
SUGIBAYASHI TADAHIKO, HANYU TAKAHIRO, ENDOH TETSUO, OHNO HIDEO,
“NONVOLATILE LOGIC GATE DEVICE,”
Publication number: US2015138877 (A1); US9536584 (B2), Publication date: 2015-05-21,
Application number: US201314400950, Application date: 20130515
12. HONJOU HIROAKI, KINOSHITA KEIZO, OHNO HIDEO,
“SEMICONDUCTOR DEVICE AND METHOD FOR MANUFACTURING SAME,”
Publication number: US2015200354 (A1); US9406869 (B2), Publication date: 2015-07-16,
Application number: US201314409886, Application date: 20130424
13. SAKIMURA NOBORU, NEBASHI RYUSUKE, SUGIBAYASHI TADAHIKO,
MATSUNAGA SHOUN, HANYU TAKAHIRO, OHNO HIDEO,
“NONVOLATILE CONTENT ADDRESSABLE MEMORY AND METHOD FOR
OPERATING SAME,”
Publication number: US2015235703 (A1); US9299435 (B2), Publication date: 2015-08-20,
Application number: US201314423321, Application date: 20130801
14. NEBASHI RYUSUKE, SAKIMURA NOBORU, SUGIBAYASHI TADAHIKO, TSUJI
YUKIHIRO, TADA AYUKA, HONJOU HIROAKI, OHNO HIDEO,
“MAGNETIC-DOMAIN-WALL-DISPLACEMENT MEMORY CELL AND INITIALIZING
METHOD THEREFOR,”
Publication number: US2015248939 (A1); US9478309 (B2), Publication date: 2015-09-03,
Application number: US201314437197, Application date: 20130913
15. FUKAMI SHUNSUKE, SATO HIDEO, YAMANOUCHI MICHIIHIKO, IKEDA SHOJI,
OHNO HIDEO,
“MAGNETIC MATERIAL AND METHOD OF MANUFACTURING THE SAME,”
Publication number: US2015332818 (A1), Publication date: 2015-11-19,
Application number: US201314647281, Application date: 20131111
16. IKEDA SHOJI, SATO HIDEO, FUKAMI SHUNSUKE, YAMANOUCHI MICHIIHIKO,
MATSUKURA FUMIHIRO, OHNO HIDEO, ISHIKAWA SHINYA,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2016233416 (A1); US9577182 (B2), Publication date: 2016-08-11,

Application number: US201415029860, Application date: 20141020

17. FUKAMI SHUNSUKE, YAMANOUCHI MICHIIHIKO, OHNO HIDEO,
“MAGNETORESISTIVE DEVICE, MAGNETORESISTIVE RANDOM ACCESS
MEMORY AND MAGNETIC RECORDING METHOD,”
Publication number: US10020039 (B2); US2016247550 (A1), Publication date: 2016-08-25,
Application number: US201615144715, Application date: 20160502
18. KANAI SHUN, MATSUKURA FUMIHIRO, OHNO HIDEO, YAMANOUCHI
MICHIIHIKO, IKEDA SHOJI, SATO HIDEO,
“CONTROL METHOD FOR MAGNETORESISTANCE EFFECT ELEMENT AND
CONTROL DEVICE FOR MAGNETORESISTANCE EFFECT ELEMENT,”
Publication number: US10127957 (B2); US2016329086 (A1), Publication date: 2016-11-10,
Application number: US201415108396, Application date: 20141113
19. OHNO HIDEO, IKEDA SHOJI, MATSUKURA FUMIHIRO, ENDOH MASAKI, KANAI
SHUN, MIURA KATSUYA, YAMAMOTO HIROYUKI,
“MAGNETORESISTIVE ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2017025600 (A1), Publication date: 2017-01-26,
Application number: US201615252128, Application date: 20160830
20. OHNO HIDEO, IKEDA SHOJI, MATSUKURA FUMIHIRO, ENDOH MASAKI, KANAI
SHUN, YAMAMOTO HIROYUKI, MIURA KATSUYA,
“MAGNETORESISTIVE ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2017110654 (A1), Publication date: 2017-04-20,
Application number: US201615392556, Application date: 20161228
21. FUKAMI SHUNSUKE, ZHANG CHAOLING, ANEKAWA TETSURO, OHNO HIDEO,
ENDOH TETSUO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY DEVICE,”
Publication number: US2017222135 (A1); US9941468 (B2), Publication date: 2017-08-03,
Application number: US201515502442, Application date: 20150729
22. NEBASHI RYUSUKE, SAKIMURA NOBORU, TSUJI YUKIHIRO, TADA AYUKA,
OHNO HIDEO,
“MAGNETIC MEMORY AND METHOD FOR WRITING DATA INTO MAGNETIC
MEMORY ELEMENT,”
Publication number: US10037789 (B2); US2017249981 (A1), Publication date: 2017-08-31,
Application number: US201515519851, Application date: 20150831

23. SATO SOSHI, NIWA MASAOKI, HONJO HIROAKI, IKEDA SHOJI, OHNO HIDEO, ENDO TETSUO,
“SPIN ELECTRONICS ELEMENT AND METHOD OF MANUFACTURING THEREOF,”
Publication number: US2017263854 (A1), Publication date: 2017-09-14,
Application number: US201615064586, Application date: 20160308
24. SATO HIDEO, ISHIKAWA SHINYA, FUKAMI SHUNSUKE, IKEDA SHOJI, MATSUKURA FUMIHIRO, OHNO HIDEO, ENDOH TETSUO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”
Publication number: US10263180 (B2); US2017324030 (A1), Publication date: 2017-11-09,
Application number: US201715657148, Application date: 20170722
25. FUKAMI SHUNSUKE, ZHANG CHAOLIANG, OHKAWARA AYATO, WATANABE KYOTA, OHNO HIDEO, ENDOH TETSUO,
“MAGNETIC MULTILAYER FILM, MAGNETIC MEMORY ELEMENT, MAGNETIC MEMORY AND METHOD FOR PRODUCING SAME,”
Publication number: WO2017208576 (A1), Publication date: 2017-12-07,
Application number: WO2017JP11283, Application date: 20170321
26. HONJO HIROAKI, IKEDA SHOJI, SATO HIDEO, ENDOH TETSUO, OHNO HIDEO,
“MAGNETIC TUNNEL JUNCTION ELEMENT AND MAGNETIC MEMORY,”
Publication number: WO2017212895 (A1), Publication date: 2017-12-14,
Application number: WO2017JP18779, Application date: 20170519
27. HANYU TAKAHIRO, SUZUKI DAISUKE, NATSUI MASANORI, MOCHIZUKI AKIRA, OHNO HIDEO, ENDOH TETSUO,
“DATA-WRITE DEVICE FOR RESISTANCE-CHANGE MEMORY ELEMENT,”
Publication number: US2017365338 (A1); US9928906 (B2), Publication date: 2017-12-21,
Application number: US201515128020, Application date: 20150324
28. FUKAMI SHUNSUKE, OHNO HIDEO, ENDOH TETSUO,
“MAGNETORESISTANCE EFFECT ELEMENT, MAGNETIC MEMORY DEVICE, MANUFACTURING METHOD, OPERATION METHOD, AND INTEGRATED CIRCUIT,”
Publication number: US2018019388 (A1), Publication date: 2018-01-18,
Application number: US201715718990, Application date: 20170928
29. HONJO HIROAKI, IKEDA SHOJI, SATO HIDEO, ENDOH TETSUO, OHNO HIDEO,
“MAGNETIC TUNNEL COUPLING ELEMENT AND METHOD FOR MANUFACTURING SAME,”
Publication number: WO2018020730 (A1), Publication date: 2018-02-01,

Application number: WO2017JP11040, Application date: 20170317

30. NATSUI MASANORI, TAMAKOSHI AKIRA, HANYU TAKAHIRO, MOCHIZUKI AKIRA, OHNO HIDEO,
“CIRCUIT DESIGN ASSIST SYSTEM, CIRCUIT DESIGN ASSIST METHOD, CIRCUIT DESIGN ASSIST PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM HAVING SAID PROGRAM RECORDED THEREON,”
Publication number: WO2018025972 (A1), Publication date: 2018-02-08,
Application number: WO2017JP28321, Application date: 20170803
31. ITO KENCHI, ENDOH TETSUO, IKEDA SHOJI, SATO HIDEO, OHNO HIDEO, MIURA SADAHIKO, NIWA MASAOKI, HONJOU HIROAKI,
“METHOD FOR PRODUCING MAGNETIC MEMORY COMPRISING MAGNETIC TUNNEL JUNCTION ELEMENT,”
Publication number: WO2018043377 (A1), Publication date: 2018-03-08,
Application number: WO2017JP30682, Application date: 20170828
32. FUKAMI SHUNSUKE, IWABUCHI TORU, OHNO HIDEO, ENDOH TETSUO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY DEVICE,”
Publication number: US2018108390 (A1), Publication date: 2018-04-19,
Application number: US201715810896, Application date: 20171113
33. HANYU TAKAHIRO, SUZUKI DAISUKE, OHNO HIDEO, ENDOH TETSUO,
“DATA WRITING DEVICE FOR VARIABLE-RESISTANCE MEMORY ELEMENT AND NON-VOLATILE FLIP-FLOP,”
Publication number: WO2018079833 (A1), Publication date: 2018-05-03,
Application number: WO2017JP39342, Application date: 20171031
34. HANYU TAKAHIRO, SUZUKI DAISUKE, OHNO HIDEO, ENDOH TETSUO,
“DATA WRITING DEVICE OF RESISTANCE VARIABLE MEMORY ELEMENT,”
Publication number: WO2018100954 (A1), Publication date: 2018-06-07,
Application number: WO2017JP39354, Application date: 20171031
35. HANYU TAKAHIRO, SUZUKI DAISUKE, OHNO HIDEO, ENDOH TETSUO,
“READING DEVICE AND LOGIC DEVICE,”
Publication number: WO2018105719 (A1), Publication date: 2018-06-14,
Application number: WO2017JP44150, Application date: 20171208
36. HONJO HIROAKI, ENDOH TETSUO, IKEDA SHOJI, SATO HIDEO, OHNO HIDEO,
“MAGNETO-RESISTIVE EFFECT ELEMENT, MAGNETIC MEMORY, AND METHOD

FOR MANUFACTURING MAGNETO-RESISTIVE EFFECT ELEMENT,”

Publication number: WO2018134929 (A1), Publication date: 2018-07-26,

Application number: WO2017JP01617, Application date: 20170118

37. KANAI SHUN, MATSUKURA FUMIHIRO, OHNO HIDEO,
“MEMORY ELEMENT AND METHOD FOR DRIVING MEMORY ELEMENT,”
Publication number: WO2018179193 (A1), Publication date: 2018-10-04,
Application number: WO2017JP13119, Application date: 20170329

38. NISHIOKA KOICHI, ENDOH TETSUO, IKEDA SHOJI, HONJO HIROAKI, SATO HIDEO,
OHNO HIDEO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”
Publication number: WO2018179660 (A1), Publication date: 2018-10-04,
Application number: WO2017JP47323, Application date: 20171228

39. SATO SOSHI, NIWA MASAACKI, HONJO HIROAKI, IKEDA SHOJI, SATO HIDEO,
OHNO HIDEO, ENDOH TETSUO,
“SPINTRONICS ELEMENT,”
Publication number: US2018301621 (A1), Publication date: 2018-10-18,
Application number: US201816013093, Application date: 20180620

40. ITO KENCHI, ENDOH TETSUO, SATO HIDEO, SAITOH TAKASHI, MURAGUCHI
MASAKAZU, OHNO HIDEO,
“MEASUREMENT METHOD AND MEASUREMENT SYSTEM FOR THERMAL
STABILITY INDEX OF MAGNETIC TUNNEL JUNCTION DEVICE,
SEMICONDUCTOR INTEGRATED CIRCUIT, AND PRODUCTION MANAGEMENT
METHOD FOR SEMICONDUCTOR INTEGRATED CIRCUIT,”
Publication number: KR20180125472 (A), Publication date: 2018-11-23,
Application number: KR20187026530, Application date: 20170322

41. SATO HIDEO, HORIKAWA YOSHIHISA, FUKAMI SHUNSUKE, IKEDA SHOJI,
MATSUKURA FUMIHIRO, OHNO HIDEO, ENDOH TETSUO, HONJO HIROAKI,
“MAGNETIC TUNNEL JUNCTION ELEMENT AND MAGNETIC MEMORY,”
Publication number: US2019019944 (A1), Publication date: 2019-01-17,
Application number: US20161577690, Application date: 20161118

42. SATO HIDEO, IKEDA SHOJI, BERSWEILER MATHIAS, HONJO HIROAKI,
WATANABE KYOTA, FUKAMI SHUNSUKE, MATSUKURA FUMIHIRO, ITO KENCHI,
NIWA MASAACKI, ENDOH TETSUO, OHNO HIDEO,
“MAGNETORESISTANCE EFFECT ELEMENT AND MAGNETIC MEMORY,”

Publication number: US2019074433 (A1), Publication date: 2019-03-07,

Application number: US201816179461, Application date: 20181102

43. HANYU TAKAHIRO, SUZUKI DAISUKE, OHNO HIDEO, ENDOH TETSUO,

“MEMORY CIRCUIT DEVICE AND METHOD FOR USING SAME,”

Publication number: WO2019054495 (A1), Publication date: 2019-03-21,

Application number: WO2018JP34229, Application date: 20180914

(10) 招待講演 / Invited Talks

1. 池田正二、佐藤英夫、山ノ内路彦、深見俊輔、水沼広太郎、金井駿、石川慎也、松倉文礼、笠井直記、大野英男、
“不揮発性集積回路応用に向けた CoFeB-MgO磁気トンネル接合の開発状況”、
独立行政法人 日本学術振興会 先端ナノデバイス・材料テクノロジー第151委員会
平成25年度 第1回研究会「最先端スピンドバイスと新しいスピン制御技術」東京
大学、平成25年5月9日
2. H. Sato, M. Yamanouchi, S. Ikeda, S. Fukami, F. Matsukura, and H. Ohno,
“MgO/CoFeB/Ta/CoFeB/MgO recording structure with low critical current and high thermal
stability,”
JSPS York-Tohoku Symposium on Magnetic Materials and Spintronic Devices, York, U.K.,
June 10-12, 2013
3. H. Ohno,
“What we can learn from ferromagnetism in semiconductors,” (*plenary*),
4th International Symposium on Organic and Inorganic Electronic Materials and Related
Nanotechnologies (EM-NANO 2013), Kanazawa, Japan, June 17-20, 2013
4. H. Ohno,
“Current status and prospect of magnetic tunnel junction,”
7th International Conference on Materials for Advanced Technologies (ICMAT), Singapore,
June 30-July 5, 2013
5. H. Ohno,
“Two and three terminal non-volatile spintronics devices for VLSI application,”
International Symposium on Advanced Magnetic Materials and Applications (ISAMMA),
Taichung, Taiwan, July 21-25, 2013
6. H. Ohno,
“Introduction to Spintronics for integrated circuit applications,”
7th International School and Conference on Spintronics and Quantum Information Technology
(SPINTECH7), Chicago, U. S. A., July 29-August 2, 2013
7. H. Ohno,
“Magnetic Tunnel Junction Technology: Materials and Performance,” (*plenary*)
International Conference on Nanoscale Magnetism (ICNM), Istanbul, Turkey, September 2-6,
2013
8. 大野英男、
“スピントロニクスメモリ素子開発の現状と今後の展望、”
第74回応用物理学会秋季学術講演会、同志社大学田辺キャンパス、平成25年9月16日
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9. T. Ohsawa, S. Ikeda, T. Hanyu, H. Ohno, and T. Endoh,
“Strategy of STT-MRAM cell design and its power gating technique for low-voltage and
low-power cache memories,”

International Conference on Solid State Devices and Materials (SSDM), Fukuoka, Japan, September 24-27, 2013

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11. S. Fukami, H. Ohno,
“Current-induced magnetic domain wall motion in Co/Ni wire and its application to nonvolatile memory devices,”
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12. H. Ohno,
“Material Status and Outlook of STT-Based Memory Technology,”
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13. S. Fukami and H. Ohno,
“Three-terminal magnetic domain wall motion device for spintronics VLSIs,”
International Japanese-French Workshop on Spintronics, Orsey, France, November 27-28, 2013
14. F. Matsukura,
“Ferromagnetic semiconductors: carrier induced ferromagnetism and electric-field effects,”
Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-18), Osaka, Japan, December 9-10, 2013
15. S. Fukami, H. Sato, M. Yamanouchi, S. Ikeda, F. Matsukura, and H. Ohno,
“Advances in spintronics devices for microelectronics –from spin-transfer torque,”
19th Asia and South Pacific Design Automation Conference (ASP-DAC), Singapore, January 20-23, 2014
16. 大野英男、
“スピントロニクス”、
北海道学力向上推進事業・札幌南高等学校講演会、平成26年2月5日
17. H. Ohno,
“Nanoscale magnetic tunnel junction”,
American Physical Society, March Meeting, Denver, U. S. A., March 3-7, 2014
18. H. Ohno,
“Spintronics: Materials through devices to integrated circuits,”
International Meeting on Spintronics for Integrated Circuits Applications and Beyond,” Tokyo, Japan, March 13, 2014
19. 大野英男、
“スピントロニクス技術を用いた論理集積回路”、
第61回応用物理学会春季学術講演会、青山学院大学相模原キャンパス、平成26年3月17日-20日
20. S. Fukami, M. Yamanouchi, S. Ikeda, and H. Ohno,
“Thermal stability and critical current for domain wall motion in nanowires with reduced dimensions,”
IEEE International Magnetism Conference (INTERMAG), Dresden, Germany, May 4-8, 2014

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 “Three-terminal spintronics cells for high-speed and nonvolatile VLSIs,”
 IEEE International Magnetics Conference (INTERMAG), Dresden, Germany, May 4-8, 2014
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 “Magnetic tunnel junctions with (Co)FeB-MgO double-interface recording structure for nonvolatile VLSIs,”
 2014 Spintronics Workshop on LSI, Hawaii, U. S. A., June 13, 2014
23. H. Ohno,
 “Current status and prospects of magnetoresistive random access memory technology,”
 6th Forum on New Materials (CIMTEC 2014), Montecatini, Italy, June 15-19, 2014
24. S. Fukami and H. Ohno,
 “Current induced domain wall motion in Co/Ni wires for nonvolatile memories and logic circuits,”
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
25. M. Hayashi, J. Torrejon , J. Kim, J. Sinha, S. Mitani, S. Takahashi, S. Maekawa, M. Yamanouchi, and H. Ohno,
 “Current induced spin orbit torques and chiral magnetic texture in magnetic heterostructures,”
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
26. L. Chen, F. Matsukura, T. Dietl, and H. Ohno,
 “Electrical detection and control of magnetization dynamics in (Ga,Mn)As,”
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
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 “Magnetization switching induced by electric field,”
 12th RIEC International Workshop on Spintronics, Sendai, Japan, June 25-27, 2014
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 “Spintronics for nonvolatile VLSIs”,
 Tsukuba Nanotechnology Symposium (TNS’ 14), Tsukuba, Japan, July 25-26, 2014
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 “Magnetic domain wall motion and spin-orbit torque induced magnetization switching for three-terminal spintronics devices,”
 IEEE International Nanoelectronics Conference (INEC), Sapporo, Japan, July 28-31, 2014
30. H. Ohno,
 “Spintronics for VLSI,”
 8th International Conference on the Physics and Applications of Spin Phenomena in Solids (PASPS 8), Washington D.C., U. S. A., July 28-31, 2014
31. H. Ohno,
 “From compound semiconductors to spintronics,”
 Lester Eastman Conference on High Performance Devices, Ithaca, U. S. A., August 5-7, 2014
32. H. Ohno,
 “Properties of CoFeB-MgO magnetic tunnel junctions down to 11nm”, (*Keynote*),
 SPIE NanoScience +Engineering, San Diego, U. S. A., August 19-21, 2014

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“スピントロニクスと集積回路 日の丸半導体復活への道、”
産学連携セミナー「寺子屋せんだい」、仙台市産業振興事業団、平成26年8月25日
34. 大野英男、
“最先端研究開発支援プログラム(FIRST)「省エネルギー・スピントロニクス論理集積回路の研究開発」での論理集積回路研究について、” 東京、平成26年8月28日
35. H. Ohno,
“Thermal stability and threshold current of nanoscale magnetic tunnel junctions,”
International Workshop on Nanomaterials (M-SNOWS), Nancy, France, September 8-11, 2014
36. H. Sato, T. Yamamoto, E. C. I. Enobio, M. Yamanouchi, S. Ikeda, S. Fukami, K. Kinoshita, F. Matsukura, N. Kasai, and H. Ohno,
“Switching Current and Thermal Stability of Perpendicular Magnetic Tunnel Junction with MgO/CoFeB/Ta/CoFeB/MgO Recording Structure Scaling Down to IX nm,”
International Conference on Solid State Devices and Materials (SSDM), Tsukuba, Japan, September 8-10, 2014
37. 深見俊輔、山ノ内路彦、池田正二、大野英男、
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38. H. Ohno,
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領域会議、仙台、平成26年9月23日～24日
40. S. Fukami, S. DuttaGupta, C. Zhang, and H. Ohno,
“Three-Terminal Spintronics Devices for Nonvolatile Memory and Logic,”
11th International Conference on Flow Dynamics (ICFD), Sendai, Japan, October 8-10, 2014
41. H. Ohno,
“Spintronics – recent advances,”
4th imec-Stanford International Workshop on Resistive Memories,” Stanford, U. S. A.,
October 27-28, 2014
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Three-Terminal Nonvolatile Spintronics Memory Device using Spin-Transfer Torque and Spin-Orbit Torque,”
14th Non-Volatile Memory Technology Symposium (NVMTS 2014), Jeju, Korea, October 27-29, 2014
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「ナノデバイス科学からの期待」、
日本学術会議公開シンポジウム「中型高輝度放射光源に期待するこれからの科学技術」、東京、平成26年10月31日
44. H. Ohno,
“Spintronics materials and devices for nonvolatile VLSIs,” (*Plenary*),

1st International Symposium on Interactive Materials Science Cadet Program (iSIMSC),
Osaka, Japan, November 16-19, 2014

45. H. Ohno,
“Nano-scale magnetic tunnel junction for nonvolatile VLSIs,”
2nd International Symposium on Functionality of Organized Nanostructures 2014 (FON14),
Tokyo, Japan, November 26-28, 2014
46. H. Ohno,
“Korea University Special Seminar,”
Korea University Special Seminar, Seoul, Korea, Dec. 4, 2014
47. 大野英男、松倉文礼、
「ナノデバイス科学からの放射光への期待」、
東北大学金属材料研究所共同利用ワークショップ「3GeV中型高輝度放射光(SLiT-J)の
実現に向けて」、東北大学、仙台、平成26年12月15日～16日
48. T. Hanyu, D. Suzuki, A. Mochizuki, M. Natsui, N. Onizawa, T. Sugibayashi, S. Ikeda, T.
Endoh, and H. Ohno,
“Challenge of MOS/MTJ-Hybrid Nonvolatile Logic-in Memory Architecture in Dark-Silicon
Era,”
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Eodoh, and H. Ohno,
“Perpendicular-Anisotropy CoFeB-MgO Based Magnetic Tunnel Junctions Scaling Down to
1X nm,”
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東北大学電気通信研究所共同プロジェクト研究S「スピントロニクス学術研究基礎と
連携ネットワーク構築に向けて」、東京大学、平成26年12月17日
51. H. Ohno,
“Nanoscale Magnetic Tunnel Junction,”
Nanyang Technological University Seminar, Singapore, Dec. 18, 2014
52. 大野英男、
「先端スピントロニクス素子・材料のブレークスルーと評価技術」、
SPRUC分野融合型研究ワークショップ「新たな分野融合型研究の開拓に向けて」、東
京、平成27年2月19日
53. 大野英男、
「AllInAs/GaInAsから強磁性半導体GaMnAsまで」
第5回化合物半導体エレクトロニクス業績賞（赤崎勇賞）受賞記念講演、第62回応用
物理学学会学術講演会、東海大学、平塚、平成27年3月11日～14日
54. H. Ohno,
“Spintronics Devices for Integrated Circuits – An Overview,” 1st CIES Technology Forum,
Tokyo, Japan, March 19, 2015
55. 羽生貴弘、鈴木大輔、望月明、夏井雅典、鬼沢直哉、杉林直彦、池田正二、遠藤哲郎、
大野英男、
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“Three-Terminal Spintronics Memory Devices with Perpendicular Anisotropy,”
International Magnetic Conference (INTERMAG), Beijing, China, May 11-15, 2015
57. H. Ohno,
“Nanoscale Magnetic Tunnel Junction –Materials Science and Device Physics-,”
Intel Seminar, Beaverton, U. S. A., May 19, 2015
58. H. Ohno,
“Spintronic Nano-Devices for Nonvolatile VLSIs”,
Frontiers in Quantum Materials and Devices Workshop and Tohoku-Harvard Workshop,
Cambridge, U. S. A., May 21-22, 2015
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5th STT-MRAM Global Innovation Forum, Tokyo, Japan, May 27, 2015
60. H. Ohno,
“Nano-Scale Magnetic Tunnel Junction Materials and Devices –Toward Nonvolatile VLSI-,”
International Conference on Spin Physics, Spin Chemistry and Spin Technology, Saint
Petersburg, Russia, June 1-5, 2015
61. H. Ohno,
“Nanoscale Magnetic Tunnel Junction,”
York-Tohoku-Kaiserslautern Symposium on New-Concept Spintronics Devices, York, UK,
June 11-13, 2015
62. F. Matsukura,
“DC Voltage in Pt/(Ga,Mn) as Under Ferromagnetic Resonance,”
York-Tohoku-Kaiserslautern Symposium on New-Concept Spintronics Devices, York, UK,
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63. H. Sato, Y. Takeuchi, N. Ohshima, S. Kubota, M. Yamanouchi, S. Ikeda, S. Fukami, F.
Matsukura, and H. Ohno,
“Properties of CoFeB-MgO Magnetic Tunnel Junctions with Perpendicular Easy Axis for
Spintronics Based VLSI Applications,”
2015 Spintronics Workshop on VLSI, Kyoto, Japan, June 15, 2015
64. H. Ohno,
“Spintronics for Stand-by Power Free VLSI,” (*Plenary*),
8th International Conference on Materials for Advanced Technologies and 16th IUMRS
International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3,
2015
65. H. Ohno,
“Nanoscale Spintronics Materials and Devices,”
8th International Conference on Materials for Advanced Technologies and 16th IUMRS
International Conference in Asia (ICMAT2015-IUMRS-ICA2015), Singapore, June 28-July 3,
2015
66. H. Ohno,
“Nano-Spintronics Devices for VLSI Integration,”
Spin Dynamics in Nanostructures, Gordon Research Conference (GRC), Hong Kong, China,
July 26-31, 2015

67. S. Fukami and H. Ohno,
 “Spin-Orbit Torque Induced Magnetization Switching for Three-Terminal Spintronics Devices,”
 2nd Spin Waves and Interactions, Greifswald, Germany, September 9-11, 2015
68. 金井駿、
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69. H. Ohno,
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 12th Sweden-Japan QNANO Workshop, Hindas Sweden, September 24-25, 2015
70. S. Fukami, H. Sato, and H. Ohno,
 “Spintronics Memory Devices for Ultralow-Power and High-performance Integrated Circuits,”
 2015 International Conference on Solid State Devices and Materials (SSDM), Sapporo,
 September 27-30, 2015
71. H. Ohno,
 “Nonvolatile VLSI Made Possible by Spintronics”,
 4th Winton Symposium, Cambridge, U. K., September 28, 2015
72. H. Sato, E. C. I. Enobio, S. Fukami, F. Matsukura, and H. Ohno,
 “Properties of Perpendicular-Anisotropy Magnetic Tunnel Junctions with Single and Double
 CoFeB-MgO Interface,”
 6th Annual Conference on Magnetism, Nanyang Technological University, Singapore, October
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73. T. Hanyu, M. Natsui, D. Suzuki, A. Mochizuki, N. Onizawa, S. Ikeda, T. Endoh, and H. Ohno,
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 Highly Dependable VLSI Computing,”
 IEEE SOI-3D-Subthreshold Microelectronics Technology Unifield Conference, Rohnert Park,
 U. S. A., October 5-8, 2015
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 Electronic and Photonics Workshop, University of California Santa Barbara, U. S. A., October
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 “Improving the Sensitivity of Vector-Network-Analyzer Ferromagnetic Resonance
 Measurement by Varying the Coplanar Waveguide Size,”
 2015 International Conference on Applied Materials and Optical Systems (ICAMOS), Cavite
 State University, Philippines, October 22-24, 2015
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 “Spintronics materials and devices for nonvolatile CMOS VLSIs”, (*Plenary*),
 16th RIES-Hokudai International Symposium, Sapporo, Japan, November 10-11, 2015
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 「3端子スピントロニクス素子とその不揮発性半導体集積回路応用」
 応用物理学会スピントロニクス研究会・日本磁気学会スピンエレクトロニクス専門研
 究会・日本磁気学会ナノマグネティックス専門研究会共同主催研究会『スピントロニ
 クス素子・回路の新展開』 中央大学駿河台記念館、2015/11/12.

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“Perpendicular σ -anisotropy CoFeB-MgO magnetic tunnel junctions for low power consumption non-volatile VLSI,”
3rd Tohoku University KTH Joint Workshop, KTH, Sweden, November 13, 2015
79. 大野英男、
「スピントロニクスによる集積回路の革新」、(特別講演)、
静岡大学工学研究所50周年記念式典、静岡大学、平成27年11月16日
80. S. Fukami, C. Zhang, S. DuttaGupta, A. Kurenkov, and H. Ohno,
“Spin-Orbit Torque Switching for Three-Terminal Spintronics Devices,”
13th RIEC International Workshop on Spintronics, Sendai, Japan, November 18-20, 2015
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「強磁性体の電界制御とその記録素子応用」
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82. 深見俊輔、張 超亮、姉川哲朗、Samik DuttaGupta、Aleksandr Kurenkov、大野英男
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“Efficiency of spintronics nanodevices,”
Spintronics Meeting in Lenna, Prague, Czech, March 30-31, 2016
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5th International Conference Smart and Multifunctional Materials, Structures and Systems (CIMTEC), Perugia, Italy, June 5-9, 2016

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IEEE Magnetic Society Summer School, Sendai, Japan, July 10-16, 2016
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 “Spin-orbit switching of magnetization,”
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 “Two-and three terminal spintronics devices for VLSI-progress in spin-orbit-torque devices,”
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 Japan, September 30, 2016
115. S. Fukami and H. Ohno,
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116. H. Ohno,
 “High-speed & external-magnetic-field free spin-orbit switching devices for VLSI,”
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“Spin-orbit torque switching for integrated circuit –from sub-ns memory to artificial intelligence,” 14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
120. S. Kanai,
“Thermal agitation and speed of switching in electric-field induced magnetization reversal of CoFeB/MgO magnetic tunnel junctions,” 14th RIEC International Workshop on Spintronics, Sendai, Japan, Nov. 17-19, 2016
121. 大野英男、
「強磁性物質におけるスピンの電氣的制御と素子応用に関する先導的研究」、
江崎玲於奈賞受賞講演会、つくば、平成28年11月22日
122. 深見俊輔、大野英男
「スピン軌道トルク磁化反転とその不揮発集積回路応用」
平成28年度 東北大学 電気通信研究所 共同プロジェクト研究会 『電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用』仙台、2016/11/22.
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「スピントロニクス技術に関する先駆的・先導的研究への貢献」、
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124. H. Ohno,
“Spin on Integrated Circuits: An Emerging Feld of Spintronics,”
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125. 深見俊輔、大野英男
「スピン軌道トルク磁化反転と集積回路応用 -超高速不揮発メモリ、人工知能-」
東北大学電気通信研究所 共同プロジェクト研究会 「固体中のスピン・ダイナミクスの物理と応用」 「スピン軌道相互作用を介した磁化・スピンダイナミクスの電氣的操作に関する研究」 東北大学、2017/1/31.
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“Nano Spintronics Devices –From Digital to Bio-inspired Computing-,” (*Plenary*),
International Symposium for Bio-Convergence Spin System, Daegu, Korea, February 9-11,
2017
128. S. Fukami and H. Ohno
“Analog Spintronics Device Based Artificial Neural Network,”

Dagstuhl Seminar 17061 “Wildly Heterogeneous Post-CMOS Technologies Meet Software,”
Schloss Dagstuhl, Germany, 2017/2/5-10.

129. 大野英男、
「電気通信研究所における最近の研究—Beyond big dataからスピントロニクスまで—」
日本工学アカデミー北海道・東北支部講演会、仙台、平成29年3月9日
130. H. Honjo, S. Ikeda, H. Sato, K. Nishioka, T. Watanabe, S. Miura, T. Nasuno, Y. Noguchi, M. Yasuhira, T. Tanigawa, H. Inoue, H. Koike, M. Muraguchi, M. Niwa, K. Ito, K. Nishioka, H. Ohno, and T. Endoh,
“Material development in advanced STT-MRAM for non-volatile VLSI,”
3rd CIES Technology Forum, Tokyo, Japan, March 21, 2017
131. J. Llandro,
“Magnetic gyroids; topological effects via 3D nanostructuring?”
Regensburg-Tohoku Workshop on Solid-State Physics and Spintronics, Sendai, Japan, March 28-30, 2017
132. A Hirohata, E. Jackson, Y. Yamamoto, B. Murphy, A. Vick, S. DuttaGupta, S. Fukami, H. Ohno, T. Kubota, and K. Takanashi,
“Imaging and Analysis of Buried Defects at Interfaces,”
“International Magnetism Conference (INTERMAG2017), Dublin, Ireland, April 24-27, 2017
133. S. Fukami and H. Ohno,
“Spin-orbit torque induced magnetization switching and its applications,”
Workshop for the Recent Development in the Spintronics, Fukui, Japan, June 3, 2017
134. H. Ohno,
“Introduction to Spintronics Devices for VLSI,”
International School and Conference (SpinTech IX), Fukuoka, Japan, June 4-8, 2017
135. H. Ohno,
“Analog spintronics memory,”
York-Tohoku-Kaiserslautern Symposium on “New-Concept Spintronics Devices, York, UK, June 21-23, 2017
136. H. Ohno,
“Three-terminal spintronics devices for CMOS integration,”
75th Device Research Conference (DRC), University of Notre Dame, U. S. A., June 25-28, 2017
137. 大野英男
「スピントロニクス –III-V族磁性半導体の創成から集積回路応用まで-」、
第4回京都大学・稲盛財団合同京都賞シンポジウム、京都、平成29年7月2日
138. J. Llandro,
“Geometrical effects in magnetism,”
York-Tohoku Summer School in Spintronics, York, UK, July 26-28, 2017
139. S. Fukami, C. Zhang, A. Kurenkov, W. A. Borders, S. DuttaGupta, and H. Ohno,
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29th International Conference on Defects in Semiconductors, (ICDS), Matsue, Japan, July 31-August 4, 2017
140. S. Fukami, C. Zhang, A. Kurenkov, W. A. Borders, S. DuttaGupta, and H. Ohno,
“Spin-orbit torque switching devices for high-speed memories and artificial synapses,”
The 28th Magnetic Recording Conference (TMRC 2017), Tsukuba, Japan, 2017/8/2-8/4.

141. S. Fukami, W. A. Borders, A. Kurenkov, H. Akima, S. Moriya, S. Kurihara, Y. Horio, S. Sato, and H. Ohno,
 “Analogue spin-orbit torque device for artificial-neural-network-based associative memory operation,”
 SPIE Optics+Photonics Nanoscience +Engineering, San Diego, U. S. A., August 6-10, 2017
142. H. Ohno,
 “Spintronics research at RIEC, past, present and future,”
 Tohoku-Hanyang Workshop on Electronics and Communications Engineering (WECE), Sendai, Japan, August 8, 2017
143. S. Fukami, A. Kurenkov, W. A. Borders, C. Zhang, S. DuttaGupta, and H. Ohno
 “Spin-orbit torque induced switching using antiferromagnets and its application to artificial neural networks”
 第41回日本磁気学会学術講演会, 九州大学, 2017/9/19-22.
144. H. Ohno,
 “Spintronics nanodevices for low-power integrated circuits,”
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai, Japan, September 23-25, 2017
145. S. Fukami,
 “Spin-orbit torque switching for high-speed nonvolatile memory applications,”
 3rd ImPACT International Symposium on Spintronics Memory, Circuit and Storage, Sendai, Japan, September 23-25, 2017
146. 大野英男、
 「スピントロニクス素子研究：材料からデバイスへ」
 平成29年度磁性材料研究会、東京、平成29年10月12日
147. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Use of analog spintronics device in performing neuro-morphic computing functions,”
 5th Berkeley Symposium on Energy Efficient Electronic System & Steep Transistors Workshop, UC Berkeley, U. S. A., October 19-20, 2017
148. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
 “Analog spin-orbit torque devices with antiferromagnet for artificial neural networks,”
 Workshop on Antiferromagnetic Spintronics, MINATEC, Grenoble, France, October 25-27, 2017
149. 深見俊輔、大野英男
 「アナログスピンメモリ素子とその人工知能応用」
 平成29年度 東北大学 電気通信研究所 共同プロジェクト研究会『電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用』仙台、2017/11/2-3.
150. H. Ohno,
 “Spintronics, a Route to Stand-by Power-free Integrated Circuits,” (**Keynote**),
 Tohoku University-National Chiao Tung University 2nd Technical Workshop 2017, Sendai, Japan, November 3, 2017
151. H. Ohno,
 “Spin on integrated circuits,”
 62nd Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, U. S. A., November 6-10, 2017
152. S. Fukami, W. A. Borders, A. Kurenkov, H. Akima, S. Moriya, S. Kurihara, Y. Horio, S. Sato, and H. Ohno,
 “An analog spin-orbit torque device for edge artificial intelligence,”

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153. 深見俊輔、W. A. Borders、A. Kurenkov、張超亮、S. DuttaGupta、大野英男、
「反強磁性/強磁性ヘテロ構造における スピン軌道トルク磁化反転と人工神経回路網
応用」、
応用物理学会スピントロニクス研究会日本磁気学会スピントロニクス専門研
究会共同主催研究会「反強磁性スピントロニクスの新展開」、東京、平成29年11月22
日
154. S. Fukami and H. Ohno,
“Spin-orbit torque switching for ultralow-power VLSI and AI hardware,”
9th MRAM Global Innovation Forum, San Francisco, U. S. A., December 7, 2017
155. W. A. Borders, H. Akima, S. Fukami, S. Moriya, S. Kurihara, A. Kurenkov, Y. Horio, S. Sato
and H. Ohno,
“An artificial neural network built with analogue spin-orbit torque devices,”
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
156. S. Fukami, C. Zhang, and H. Ohno,
“Sub-nanosecond field-free spin-orbit torque switching,”
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
157. K. Watanabe, B. Jinnai, S. Fukami, H. Sato, and H. Ohno,
“High performance single-digit-nanometer perpendicular magnetic tunnel junctions,”
15th RIEC International Workshop on Spintronics, Sendai, Japan, December 13-14, 2017
158. H. Sato, P. Chureemart, F. Matsukura, R. W. Chantrell, H. Ohno, and R. F. L. Evans,
“Temperature dependence of spontaneous magnetization and magnetic anisotropy in
CoFeB/MgO thin films: experiments versus simulations,”
6th Core-to-core Workshop on “New-Concept Spintronic Devices,” Sendai, Japan, December
15-16, 2017
159. S. Fukami,
“Analog spin-orbit torque devices for artificial neural networks,”
Japan-Korea Spintronics Workshop, Seoul, Korea, December 18-20, 2017
160. H. Ohno,
“Spintronics for information processing –from low-power integrated circuits to artificial
intelligence,” (*keynote*),
Tsinghua-Tohoku Joint Workshop on Materials and Spintronics, Beijing, China, December 21,
2017
161. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno
「アナログスピントロニクスメモリを用いた 人工神経回路網」
東北大学電気通信研究所 共同プロジェクト研究会「新規固体デバイス・回路を用い
た脳型コンピューティングに関する研究」、東北大学、平成29年12月26日
162. 大野英男、
「不揮発スピントロニクス素子と省エネ集積回路」、
文部科学省表彰受賞記念講演会、日立製作所、平成30年1月11日
163. S. Fukami and H. Ohno,
“Spin-orbit torque switching in ferromagnetic heterostructures and its application,”
Reimei/GP-Spin/ICC-IMR International Workshop “New Excitations in Spintronics”, Sendai,
Japan, January 11, 2018

164. H. Ohno,
 “Spintronics nanodevice-faster, smaller and more intelligent,”
 Tohoku-Harvard Workshop, Sendai, Japan, January 18-19, 2018
165. 深見俊輔、W. A. Borders、A. Kurenkov、張超亮、S. DuttaGupta、大野英男、「Spin-orbit torque devices for artificial neural networks,」
 日本磁気学会第216回研究会、第66回スピントロニクス専門研究会「ニューロモブリックスピントロニクス」、東京、平成30年1月25日
166. 大野英男、
 「超微細スピントロニクス素子とその集積回路、AI応用」、(基調講演)、
 第16回ナノテクノロジー総合シンポジウム、東京、平成30年2月16日
167. S. Fukami and H. Ohno
 “Analog spin-orbit torque devices for edge AI hardware,”
 Tohoku-Purdue Workshop on Novel Spintronics Physics and Materials for Future Information Processing, Sendai, Japan, February 18, 2018
168. H. Ohno,
 “Nano-spintronics Devices for Integrated Circuits and Artificial Intelligence,”
 Kick-off Symposium for World Leading Research Centers -Materials Science and Spintronics-, Sendai, Japan, February 19-20, 2018
169. H. Sato, K. Watanabe, B. Jinnai, S. Fukami, and H. Ohno,
 “Development of (Co)FeB/MgO-based magnetic tunnel junctions down to X nm,”
 Tohoku/SG-Spin Workshop on Spintronics, Sendai, Japan, February 20-21, 2018
170. 大野英男、
 「スピントロニクス不揮発性素子」、
 科学協力学術センター第39回市民型講座、仙台、平成30年3月6日
171. 深見俊輔、William A. Borders, Aleksandr Kurenkov, 張超亮、Samik DuttaGupta, 大野英男
 「アナログスピンメモリ素子を用いた人工神経回路網」
 第65回応用物理学会春季学術講演会、早稲田大学西早稲田キャンパス、東京、2018/3/17-20.
172. H. Ohno,
 “Spintronics Nanoelectronics –Faster, smaller, and smaller-,”
 4th CIES Technology Forum, Tokyo, Japan, March 22, 2018
173. H. Ohno,
 “Spintronics Nanodevices”, (*Plenary*),
 INTERMAG 2018, Singapore, April 23-27, 2018
174. S. Fukami and H. Ohno,
 “Nonvolatile memory devices with magnetic nanowires controlled by spin-transfer and spin-orbit torques,”
 IEEE International Magnetism Conference (INTERMAG 2018), Singapore, 2018/04/23-2018/04/28.
175. S. Fukami,
 “Potential and challenges of nonvolatile spintronics devices for integrated circuits applications,” (*invited lecture*)
 7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern “New concepts for future spintronic devices”, Kaiserslautern, Germany, 2018/05/28-2018/05/30.

176. S. Fukami, C. Zhang, W. A. Borders, A. Kurenkov, S. DuttaGupta, and H. Ohno, "Spin-orbit torque switching and its applications – from high-speed memory to artificial neural network," 5th International Conference of Asian Union of Magnetism Societies (IcAUMS 2018), Jedu, Korea, 2018/06/03-2018/06/07.
177. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Spintronic analog memory for neuromorphic computing," 14th International Conference on Modern Materials and Technologies (CIMTEC2018), Perugia, Italy, 2018/06/04-2018/06/14.
178. H. Sato, K. Watanabe, B. Jinnai, S. Fukami, H. Honjo, S. Ikeda, T. Endoh, and H. Ohno, "High-performance (Co)FeB/MgO-based magnetic tunnel junctions with perpendicular easy axis down to single-digit nanometer scale," 2018 Spintronics Workshop on LSI, Honolulu, Hawaii, USA, 2018/06/17.
179. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Neuromorphic computing with analog spin-orbit torque device," Workshop on Spintronics and Nanomagnetism for Neuromorphic Computing, Leeds, UK, 2018/06/26-2018/06/27.
180. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Analog spin-orbit torque devices for artificial neural networks," The 21st International Conference on Magnetism (ICM2018), San Francisco, USA, 2018/07/16-2018/07/20.
181. S. Fukami, C. Zhang, B. Jinnai, and H. Ohno, "Spin-orbit torque switching device for high-performance and low-power integrated circuits," The 23rd International Colloquium on Magnetic Films and Surfaces (ICMFS-2018), UC Santa Cruz, USA, 2018/07/22-2018/07/27.
182. S. DuttaGupta, R. Itoh, S. Fukami, and H. Ohno, "Angular dependence of magnetoresistance in nonmagnet/antiferromagnet bilayer structure," Tohoku-Tsinghua Joint Workshop on Materials and Spintronics Sciences, Sendai, Japan, 2018/07/26.
183. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Neuromorphic computing with analog spin-orbit torque devices," (*invited lecture*) The 10th International School and Conference on Physics and Applications of Spin Phenomena in Solids – PASPS10, Linz, Austria, 2018/08/05-2018/08/09.
184. H. Ohno, "Opening - from PASPS-1 to PASPS-10," The 10th International School and Conference on Physics and Applications of Spin Phenomena in Solids – PASPS10, Linz, Austria, 2018/08/05-2018/08/09.
185. W. A. Borders, S. Fukami, and H. Ohno, "Antiferromagnet/Ferromagnet Based Spin-Orbit Torque Devices for Hopfield Network Applications," Explorative Workshop: Spintronic Perspectives on Neuromorphic Computing, Jülich, Germany, 2018/08/13-2018/08/15.
186. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno, "Analog spintronics device for artificial neural networks," The 2018 International Symposium on Nonlinear Theory and Its Applications (NOLTA2018), Tarragona, Spain, 2018/09/02-2018/09/06.
187. W. A. Borders, S. Fukami, and H. Ohno, "Analog spin-orbit torque switching for neuromorphic application,"

第42回日本磁気学会学術講演会, 日本大学理工学部駿河台キャンパス、東京、2018/09/11-2018/09/14.

188. 大野英男,
“スピントロニクスと産学連携,”
第46回日本放射線技術学会秋季学術大会, 仙台、東京, 2018/10/04-2018/10/06.
189. 深見俊輔、大野英男,
“反強磁性/強磁性積層構造におけるスピン軌道トルク磁化反転,”
第1回ナノスピン研究会「放射光を用いたナノスピン材料科学の新展開」, 東北大学、仙台, 2018/10/05.
190. C. Zhang, Y. Takeuchi, S. Fukami, and H. Ohno,
“Spin-orbit torque switching in nanoscale devices – physics and material engineering,”
KITS Workshop 2018, Beijing, China, 2018/10/01-2018/10/19.
191. S. Fukami, W. A. Borders, A. Kurenkov, C. Zhang, S. DuttaGupta, and H. Ohno,
“Associative memory operation using analog spin-orbit torque device,”
SPICE Workshop - Spintronics meets Neuromorphics, Mainz, Germany,
2018/10/08-2018/10/12.
192. H. Ohno,
“Spintronics Nanodevices,” (*Plenary*)
14th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures & 26th International Colloquium on Scanning Probe Microscopy (ACSIN-14 & ICSPM26), Sendai, Japan, 2018/10/21-2018/10/25.
193. 深見俊輔、大野英男,
“アナログスピン軌道トルク素子を用いた人工神経回路網,”
東京大学CSRN主催ワークショップ「スピン、ニューロモルフィック・コンピューティング」, 東京大学、東京, 2018/10/27.
194. 深見俊輔,
“一桁ナノメートル磁気トンネル接合,”
平成30年度東北大学電気通信研究所共同プロジェクト研究会「電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用」, 仙台, 2018/11/01-2018/11/02.
195. 深見俊輔、大野英男,
“アナログスピントロニクス素子を用いた脳型情報処理,”
応用物理学会・量子エレクトロニクス研究会「量子エレクトロニクスによる未来型情報処理」, 上智大学軽井沢セミナーハウス、長野, 2018/12/14-2018/12/16.
196. S. Fukami and H. Ohno,
“Spin-Orbit Torque Switching in Nanoscale Devices: Material and Device Engineering,”
16th RIEC International Workshop on Spintronics and 8th JSPS Core-to-Core Workshop on “New-Concept Spintronic Devices” , Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, 2019/01/09-2019/01/12.
197. 深見俊輔,
“スピントロニクス素子の新機能創出,”
東北大学電気通信研究所 共同プロジェクト研究会「新規固体デバイス・回路を用いた脳型コンピューティングに関する研究」, 東北大学電気通信研究所, 2019/01/15.
198. 深見俊輔、大野英男,
“不揮発性スピントロニクス素子技術 — 大容量化、高速化、多機能化に向けた取り組み,”
日本学術振興会「先端ナノデバイス・材料テクノロジー第151委員会」平成30年度第6回研究会, 東京大学本郷キャンパス工学部, 2019/02/01.

199. M. Shinozaki, J. Igarashi, J. Llandro, S. Fukami, H. Sato, and H. Ohno,
“Size Dependence of the Influence of Edge Effects in Nanoscale Perpendicular-Anisotropy Magnetic Tunnel Junctions,”
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
200. K. Watanabe, B. Jinnai, S. Fukami, H. Sato and H. Ohno,
“1X and X nm Perpendicular-easy-axis Magnetic Tunnel Junctions utilizing Shape Anisotropy,”
The 2nd Symposium for World Leading Research Centers, Sendai International Center, Sendai, 2019/02/15-2019/02/17.
201. 深見俊輔、高橋佑、竹内祐太朗、張超亮、陣内佛霖、大野英男,
“プレーナーホール効果を用いた面内スピン軌道トルク素子の特性評価,”
第2回スピントロニクス学術研究基盤と連携ネットワークシンポジウム, 東北大学金属材料研究所, 2019/02/20.
202. S. Fukami and H. Ohno,
“Spin orbitronics for high-speed memory and artificial neural network,”
2nd Tohoku/SG-SPIN Workshop in Spintronics, National University of Singapore, Singapore, 2019/02/22-2019/02/23.
203. 深見俊輔,
“不揮発性スピントロニクス素子とその応用,”
東北大学電気通信研究所-早稲田大学ナノ・ライフ創新研究機構 共同プロジェクト研究(ナノエレクトロニクスに関する連携研究) 平成30年度研究会, 早稲田大学理工学術院 (西早稲田キャンパス)、東京, 2019/02/26.
204. S. Fukami,
“Spintronic Devices for Neural Networks,”
APS March Meeting 2019, Boston, Massachusetts, USA, 2019/03/03-2019/03/07.

2. 学会活動 / Activities in academic societies

(ア) 学会役員等の活動 / Activities on committees of academic societies

1. Institute of Physics (IOP) Fellow (Hideo Ohno)
2. American Physical Society (APS) Fellow (Hideo Ohno)
3. Institute of Electrical and Electronics Engineers (IEEE) Fellow (Hideo Ohno)
4. 応用物理学会 フェロー (大野英男)
5. 応用物理学会 スピントロニクス研究会 幹事 (大野英男)
6. 電子材料シンポジウム 運営委員 (2014-2015 : 運営委員長) (大野英男)
7. 日本磁気学会 広報委員 (2011/6 - 2015/7) (深見俊輔)
8. 日本磁気学会 企画委員 (2015/6 - 2019/5) (深見俊輔)
9. 日本磁気学会 スピンエレクトロニクス専門研究会 世話人 (2017/4 - 現在) (深見俊輔)
10. IEEE Nanotechnology Council, Spintronics Technical Committee (2018/1 - present) (Shunsuke Fukami)
11. 応用物理学会 スピントロニクス研究会 企画幹事 (2015/1-2016/12) (金井駿)

(イ) 学術的国際会議の企画・運営

Planning and organizing academic international conferences.

1. International Advisory Committee, 8th International Symposium on Metallic Multilayers (MML2013) (Kyoto, Japan, May 19-24, 2013)
2. Program Chair, 2013 Spintronics Workshop on LSI (Kyoto, Japan, June 10, 2013)
3. Program Committee (MSS), 20th International Conference on Electronic Properties of Two-Dimensional Systems (EP2DS-20) and 16th Modulated Semiconductor Structures (MSS-16) (Wroclaw, Poland, July 1-5, 2013)
4. Organizing Committee, 32nd Electronic Materials Symposium (EMS) (Izu, Japan, July 10-12, 2013)
5. International Advisory Committee, 7th International School and Conference on Spintronics and Quantum Information Technology (SPINTECH VII) (Chicago, U. S. A., July 29-August 2, 2013)
6. Organizing Committee, 3rd Berkeley Symposium on Energy Efficient Electronic Systems (Berkeley, U. S. A., October 28-29, 2013)
7. Organizer, 4th International Symposium on Spintronics for Integrated Circuit Applications and Beyond, Tokyo, Japan, March 13, 2014
8. Program Chair, Spintronics Workshop on LSI, Honolulu, Hawaii, June 13, 2014
9. International Advisory Board, International Conference on Modern Materials and Technologies (CIMTEC), (Montecatini Terme, Italy, June 8-20, 2014)
10. Program Committee, 14th European Conference Physics of Magnetism 2014 (PM'14) (Poznan, Poland, June 23-27, 2014)
11. Organizer, 12th RIEC International Workshop on Spintronics, (Sendai, Japan, June 25-27, 2014)

12. Program Committee, International Conference on Superlattices, Nanostructures and Nanodevices (ICSNN) (Savannah, Georgia, U. S. A., August 3-8, 2014)
13. Advisory Committee, 32nd International Conference on Physics of Semiconductors (ICPS2014) (Austin, U. S. A., August 10-15, 2014)
14. Chair, 5th STT-MRAM Global Innovation Forum (Tokyo, Japan, May 27, 2015)
15. Organizer, York-Tohoku-Kaiserslautern Research Symposium on “New Concept Spintronics Devices”, (York, UK, June 11-13, 2015)
16. International Advisory Committee, 21st International Conference on Electronic Properties of Two-Dimensional Systems (EP2DS) and the 17th International Conference on Modulated Semiconductor Structures (MSS) (Sendai, Japan, July 26-31, 2015)
17. International Advisory Committee, 8th International School and Conference on Spintronics and Quantum Information Technology (Spintech8) (Basel, Switzerland, August 10-14, 2015)
18. Local Organizing Committee, 40th International Conference on Infrared, Millimeter and THz Waves (IRMMW-THz 2015) (Sendai, Japan, September 27-October 2, 2015)
19. Organizer, 13th RIEC International Workshop on Spintronics, (Sendai, Japan, November 18-20, 2015)
20. Organizer, International Workshop: Spintronics VLSI, (Sendai, Japan, November 20-21, 2015)
21. International Advisory Board, Co-Chair, International Conference on Modern Materials and Technologies (CIMTEC) (Perugia, Italy, June 5-10, 2016)
22. International Advisory Committee, 9th International Symposium on Metallic Multilayers (MML2016) (Uppsala, Sweden, June 19-23, 2016)
23. Local Advisory Committee, IEEE Magnetics Society Summer School (Sendai, Japan, July 10-16, 2016)
24. International Advisory and Program Committee, 9th International Conference on Physics and Applications of Spin-related Phenomena in Solids (PASPS-IX) (Kobe, Japan, August 8-11, 2016)
25. Advisory Committee, 33rd International Conference on the Physics of Semiconductors (ICPS) (Beijing, China, July 31-August 5, 2016)
26. Organizer, 14th RIEC International Workshop on Spintronics, (Sendai, Japan, November 17-19, 2016)
27. International Advisory Committee, 9th International School and Conference on Spintronics and Quantum Information Technology (Spintech9) (Fukuoka, Japan, June 4-8, 2017)
28. International Advisory Committee, 22nd International Conference on Electronic Properties of Two-Dimensional Systems (EP2DS-22) and 18th International Conference on Modulated Semiconductor Structures (MSS-18) (Penn State University, U. S. A., July 31-August 4, 2017)
29. Chair, 2017 International Conference on Solid State Devices and Materials (SSDM), (Sendai, Japan, September 19-22, 2017)
30. Organizer, 15th RIEC International Workshop on Spintronics, (Sendai, Japan, December 13-14, 2017)

31. Organizer, Core-to-core Tohoku-York-Kaiserslautern Workshop on “New Concept Spintronics Devices”(Sendai, Japan, December 15, 2017)
32. Organizer, Tohoku –Harvard Workshop (Sendai, Japan, January 18-19, 2018)
33. Organizer, Tohoku-Purdue Workshop on Novel Spintronics Physics and Materials for Future Information Processing (Sendai, Japan, February 18, 2018)
34. Organizer, Kick-off Symposium for World Leading Research Center – Materials Science and Spintronics -, (Sendai, Japan, February 19-20, 2018)
35. Organizing Committee, Tohoku/SG-Spin Workshop on Spintronics (Sendai, Japan, February 20-21, 2018)
36. Program Committee, International Conference of Magnetism (ICM) (San Francisco, U.S.A., July 16-20, 2018)
37. Chair, 16th RIEC International Workshop on Spintronics, (Sendai, Japan, January 9-10, 2019)
38. Local staff, Core-to-core Tohoku-York-Kaiserslautern Workshop on “New Concept Spintronics Devices” (Sendai, Japan, January 11-12, 2019)

(ウ) 学術論文誌の編集・査読 / Editor and reviewer for academic journals.

1. NPG Asia Materials (Advisory Board)
2. Journal of Magnetism, Korean Magnetism Society (Editor (Overseas))
3. Journal of SPIN (Editorial Board (Consulting Editor))
4. Nature Communications (Editorial Advisory Panel)
5. Journal of Applied Physics, Special Topic Issue on New Physics and Materials for Neuromorphic Computation (Guest Editor)

3. 社会貢献 / Contributions to society

(ア) 教育活動 / Educational activities outside university

内閣府・最先端研究開発支援プログラム「省エネルギー・スピントロニクス論理集積回路の研究開発」においては、日本電気、日立製作所、ULVAC、東京大学、NIMS が参画して研究を行っている。さらにプログラムを通じてポスドク、大学院生など若手研究者の人材育成も行なった。

(イ) 産業界における指導・啓蒙 / Instruction and education for industry

日立製作所との共同研究「ナノスピン材料およびスピン素子に関する研究」ほか、JAXA、デンソーの研究指導を行った。

文部科学省受託研究「耐災害性に優れた安心・安全社会のためのスピントロニクス材料・デバイス基盤技術の研究開発」においては、不揮発性スピントロニクスワーキングメモリを実現することで耐災害性に優れた安心・安全社会のためのコンピュータシステムの構築

をめざし、独立行政法人宇宙航空研究開発機構、日本電気、東栄科学産業、京都大学、NIMS、山形大学との産学官連携による研究開発を実施している。殊に東北大学が地元企業との共同開発を行うことで被災地域におけるこの分野の産業力の増強を図っている。

革新的研究開発推進プログラム(ImPACT)「スピントロニクス集積回路を用いた分散型 IT システム」においてはスピントロニクス技術を用いた既存の集積回路不揮発化による低消費電力デジタル情報処理の確立をめざした。産業界からはルネサスエレクトロニクス、東京エレクトロンの参画を得ている。

(ウ) 国・地方自治体・公共団体における活動

Activities for national and local governments, and public organizations

日本学術会議会員

科学技術振興機構 CREST・さきがけ「微小エネルギーを利用した革新的な環境発電技術の創出」領域アドバイザー

SPring-8 ユーザー協同体 (SPRUC) 評議員

(エ) アウトリーチ活動 / Outreach activities

(一般向け講演など)

行事名	タイトル	開催日
日本学術会議発行「学術の動向」誌掲載記事	日本の復興・再生に向けた産学官連携の新しいありかた「産学官連携に対する現状と課題 一学の視点から」	2013.09.01
読売テクノフォーラム研究交流会	「日の丸半導体復活への道」	2013.10.16
FIRST 研究成果ビジネスマッチングシンポジウム -- 日本の電子産業、復活の狼煙 (のろし) --	スピントロニクスが拓く新しい集積回路の世界	2014.1.22
北海道学力向上推進事業・札幌南高等学校講演会	スピントロニクス	2014.2.5
仙台市産業振興事業団 産学連携セミナー「寺子屋せんだい」	スピントロニクスと集積回路 日の丸半導体復活への道	2014.8.25
Tohoku University Science Summer School (TSSP)	Introduction to Spintronics	2015.7.7
河合塾仙台校 特別イベント「知の広場」	「スピントロニクス」ってなに？	2015.7.30
静岡大学電子工学研究所創立 50 周年記念式典	スピントロニクスによる集積回路の革新	2015.11.16
大阪大学産業科学研究所第 71 回学術講演会	スピントロニクス素子とその集積回路応用	2015.11.24
東京大学物理学教室コロキウム	スピントロニクス：物理から工学への道	2016.1.8
仙台高等専門学校特別講義	スピントロニクスの研究開発最前線ー集積回路応用に向けてー	2016.1.20
自然科学研究機構分子科学研究所長招聘会議	化学におけるグローバルイノベーション	2016.5.13
東北大学談話会「萩の夕べ」	スピントロニクスが世界を変える	2016.5.18
Tohoku University Science	Introduction to Spintronics	2016.7.11

Summer School (TSSP)		
National University of Singapore Seminar	Spintronics Nano-Device for VLSI	2016.8.1
第13回江崎玲於奈賞受賞記念講演会	強磁性物質におけるスピンの電氣的制御と素子応用に関する先導的研究	2016.11.22
野村證券セミナー	スピントロニクスがもたらす可能性	2016.11.24
2016年度C&C賞受賞講演	スピントロニクス技術に関する先駆的・先導的研究への貢献	2016.11.30
日本工学アカデミー北海道・東北支部講演会	電気通信研究所における最近の研究 -Beyond big data からスピントロニクスまで-	2017.3.9
特定非営利活動法人 科学協力学際センター第39回市民型講座	スピントロニクス不揮発性素子	2018.3.6

(新聞、雑誌報道など)

	掲載新聞名	タイトル	掲載日
新聞	日経産業新聞	インタビュー 日本の頭脳(13)待機電力ゼロ半導体	2013.4.23
新聞	日経産業新聞	微小な磁気、正確に測定、東北大、省エネ型素子開発に活用	2013.4.23
新聞	日刊工業新聞	強磁性ナノ細線の障壁、電流と磁場で差異-京大など発見	2013.6.18
雑誌	2013年版ものづくり白書	スピントロニクス素子と半導体集積回路の融合でナノテクノロジーを深化	2013.7.1
新聞	日経産業新聞	強磁性半導体の開発、東北大野英男氏(上)	2013.7.23
新聞	日経産業新聞	強磁性半導体の開発、東北大野英男氏(下)	2013.7.24
新聞	日本経済新聞	東北大、超高速で演算、磁気素子を開発	2013.8.20
新聞	科学新聞	ナノ秒電流パルスによる磁壁の高制御性を実証	2013.9.13
新聞	日経産業新聞	第2部産業新聞40周年特集、日本の独創力-日本科学技術40年史	2013.10.1
雑誌	電子情報通信学会誌	スピントロニクスを用いた集積回路と省エネ社会への貢献	2013.10.1
新聞	朝日新聞	ノーベル賞を占う、来週発表、有力研究・日本人は	2013.10.3
新聞	東京読売新聞	読売テクノ・フォーラム 日の丸半導体復活へ新技術	2013.10.17
新聞	日経産業新聞	東北大発、メモリー革命-MRAM、開発拠点始動、東芝出身教授を軸に日米20社強参画、黒子は東エレクト	2013.11.28
新聞	日経産業新聞	電流量100分の1で動作、東北大、半導体メモリ素子開発	2013.12.11
新聞	日刊工業新聞	20ナノメートル素子書き換え低消費電力	2013.12.27
新聞	河北新報	電子産業復興 研究者ら探る 仙台でシンポ	2014.1.23
新聞	日経産業新聞	次世代電子スピン技術 究極の記憶素子に応用	2014.2.3
新聞	日刊工業新聞	東北大と NEC、スピントロニクス活用し無	2014.2.11

		線センサーの電池寿命を 10 倍に延ばす技術	
新聞	半導体産業新聞	垂直磁化で大容量実現へ	2014.2.12
新聞	半導体産業新聞	(インタビュー)11nm 素子で世界初の動作確認 大容量 MRAM 実現に道筋	2014.2.12
新聞	日刊工業新聞	期待高まるノーベル賞	2014.9.29
新聞	毎日新聞	ノーベル賞、6 日から発表 日本の科学者受賞に期待	2014.10.2
新聞	日経産業新聞	大学解剖「実学の杜 最先端を走る	2015.1.20
ウェブ	日経テクノロジーオンライン	省エネ半導体で日本の復権を、東北大がフォーラム	2015.3.23
新聞	北海道新聞	ノーベル賞有力 北海道ゆかりの 4 人	2015.11.16
ウェブ	日経速報ニュース	東北大、ミクロな磁気構造のゆっくりした変化に統一的な理解もたらす	2015.12.15
新聞	毎日新聞	未踏の世界へ「新しい『磁性半導体』を開発 東北大学電気通信研究所長・大野英男さん」	2016.1.14
新聞	日経産業新聞	省エネ半導体実用化へ 消費電力 100 分の 1 に	2016.4.25
ウェブ	Sankei Biz	江崎玲於奈賞に東北大の大野教授	2016.9.6
新聞	日経産業新聞	江崎玲於奈賞に大野東北大教授	2016.9.6
新聞	読売新聞	大野英男教授に江崎玲於奈賞	2016.9.6
新聞	朝日新聞	江崎玲於奈賞に大野教授	2016.9.6
新聞	日刊工業新聞	大野東北大教授が江崎玲於奈賞受賞	2016.9.6
新聞	日刊工業新聞	革新の系譜・日本の科学技術力/半導体スピントロニクス、見えてきた実用化	2016.9.23
ウェブ	日刊工業新聞	ノーベル賞いよいよ来週一日本人 3 年連続に期待	2016.9.26
新聞	日刊工業新聞	C&C 賞 大野東北大教授ら選出 NEC	2016.10.14
新聞	日経産業新聞	日本支えた半導体の衰退 政府支援の研究拠点を	2016.10.31
新聞	読売新聞	大野教授「責任感じる」江崎玲於奈賞 つくば賞で授賞式	2016.11.23
新聞	茨城新聞	「感激と責任感じる」江崎賞 大野氏を表彰	2016.11.23
新聞	読売新聞	「顔」磁性半導体で江崎玲於奈賞 大野英男さん	2016.11.24
テレビ	東北放送	N スタみやぎ「ナノテクノロジーの世界的権威ノーベル賞候補の東北大教授とは」	2016.11.29
新聞	日経産業新聞	人工の神経回路網 磁気素子活用 形崩れた文字識別	2016.12.19
テレビ	NHK	おはよう宮城「人工知能画像認識の省エネ技術」	2016.12.19
新聞	日刊工業新聞	脳に似た情報処理可能 東北大 人口神経回路網を開発	2016.12.29
新聞	夕刊読売新聞	リサーチフロント 電子の磁力で省エネ	2017.8.3
新聞	夕刊読売新聞	リサーチフロント 集積回路 省エネの切り札	2017.8.24
雑誌	Newton	トップランナー「電子のスピンでコンピューター革命」電子がもつ磁石の性質を利用する「スピントロニクス」	2017 年 11 月号
新聞	日刊工業新聞	日本人 4 年連続なるか ノーベル賞発表迫る	2017.9.22
ウェブ	日本経済新聞電子	東北大、磁気トンネル接合素子の新方式	2018.2.14

	版	提案し世界最小となる一桁ナノメートルサイズでの動作実証に成功	
ウェブ	日本経済新聞電子版	記憶容量、DRAMの10倍以上へ、東北大が新素子	2018.2.17
新聞	日本経済新聞	磁石の性質使う新メモリー、容量、DRAMの10倍、東北大、微細な素子開発	2018.2.19

(展示会出展、一般公開など)

行事・内容	場所、参加者数	開催日
TIA-連携棟オープニングセレモニー，研究成果展示	産業技術総合研究所 つくば西事業所，参加者：182人	2013/6/2
通研公開 2013 研究成果展示，スピントロニクスに関する研究内容について市民等に紹介	東北大学電気通信研究所，参加者：1,975人	2013/10/12
産総研オープンラボ 2013，探そう、明日を拓く技術。研究成果展示	産業技術総合研究所，来場者：800人	2013/11/1
サイエンスアゴラ 2013，研究成果展示	日本科学未来館，来場者：8,500人	2013/11/9
東京フォーラム 2013，研究成果展示	学術総合センター，参加者：269人	2013/11/21
第4回つくばイノベーションアリーナ公開シンポジウム 「つくば」から未来の産業へ，研究成果展示	イイノホール，来場者：275人	2013/12/16
東北大学イノベーションフェア 2014 産と学の最先端テクノロジーがつくる「新しい未来」，研究成果展示	仙台国際センター，来場者：650人	2014/1/28
Nanotec 2014 (TIA-nano ユーザーの成果)，研究成果展示	東京ビッグサイト，来場者：1600人	2014/1/29
FIRST 研究成果ビジネスマッチングシンポジウム in 京都，研究成果展示	きらっ都プラザ京都産業会館 8.9階，来場者 337人	2014/2/10
FIRST EXPO2014，講演(大野英男)「機器・システムの限界への挑戦/研究成果展示	ベルサール新宿グラウンド，来場者：1,400人	2014/2/28
通研公開 2014，研究室・研究施設の一般市民への紹介・公開	東北大学電気通信研究所，来訪者数：803名.	2014/10/4～5
東北大学オープンキャンパス 2015：スピントロニクスの世界へようこそ！～次世代スピントロニクスメモリを体験しよう！～，実施している研究内容について高校生，大学生に紹介	東北大学工学部電気系，来訪者 200名.	2015/7/29～30
通研公開 2015，研究室・施設の一般市民への紹介・公開	東北大学電気通信研究所，来訪者 2,687名.	2015/10/10～11
東京フォーラム 2015，研究成果展示・公開	学術総合センター，来訪者 251名.	2015/11/25
東北大学イノベーションフェア 2015，産学連携の推進を目的とする研究成果展示・紹介	仙台国際センター，来訪者 916名.	2015/12/9
通研公開 2016，研究室・施設の一般市民への紹介・公開	東北大学電気通信研究所，来訪者 2,616名.	2016/10/8-9
仙台フォーラム 2016，研究成果展示・公開	仙台国際ホテル，来訪者 238名.	2016/11/30
第13回江崎玲於奈賞受賞者研究室の見学，茨城県の高校生による研究室見学	東北大学電気通信研究所，参加者 12名.	2016/12/17
3rd CIES Technology Forum, ImPACT での取り組みを紹介	ステーションコンファレンス東京サピアタワー5F，参加	2017/3/22

	者 214 名.	
通研公開 2017, 研究室・施設の一般市民への紹介・公開	東北大学電気通信研究所, 来訪者 2,137 名.	2017/10/7-8
東京フォーラム 2017, 研究成果展示・公開	学術総合センター, 来訪者 266 名.	2017/10/31
ImPACT シンポジウム, 研究成果展示・公開	品川インターシティーホール, 定員 300 名.	2018/2/27
通研公開 2018, 省エネルギー・スピントロニクス集積化システムセンターの取り組みを紹介	東北大学電気通信研究所, 来訪者, 約 2,800 名.	2018/10/6-7

4. 競争的資金の獲得状況 / Research funds/grants received

(ア) 科学研究費補助金 / Grant-in-Aid for Scientific Research (KAKENHI)

1. 日本学術振興会科学研究費助成事業（科学研究費補助金）研究活動スタート支援
「金属薄膜磁性の電界変調効果の増大を目指した材料開発（代表者名：金井駿）」
2014年8月～2016年3月 2,730千円
2. 日本学術振興会科学研究費助成事業（科学研究費補助金）若手研究（A）
「極微細世代における新規磁壁移動方式の研究と3次元デバイスへの展開（代表者名：深見俊輔）」
2015年4月～2018年3月 15,210千円
3. 日本学術振興会科学研究費助成事業（学術研究助成基金助成金）挑戦的萌芽研究
「スピン軌道トルクを用いた新規磁化制御方式の研究と3端子磁気メモリ素子への応用（代表者名：深見俊輔）」
2015年4月～2017年3月 3,770千円
4. 日本学術振興会科学研究費助成事業（科学研究費補助金）若手研究（A）
「磁性体／絶縁体界面磁気異方性の電界制御の研究（代表者名：金井駿）」
2016年4月～2018年3月 12,870千円
5. 日本学術振興会科学研究費助成事業（科学研究費補助金）特別推進研究
「スピントロニクスを用いた人工知能ハードウェアパラダイムの創成（代表者名：大野英男）」
2017年4月～2022年3月 447,300千円
6. 日本学術振興会科学研究費助成事業（国際共同研究加速基金（国際共同研究強化(B)））
「反強磁性ヘテロ構造におけるスピン軌道トルク磁化反転の空間・元素・時間分解観察（代表者名：深見俊輔）」
2018年10月～2021年3月 13,800千円

(イ) 受託研究費 / Other grants and subsidies

2013 年度

文部科学省「卓越した大学院拠点形成支援補助金」 810 千円

文部科学省受託研究費「耐災害性に優れた安心・安全社会のためのスピントロニクス材料・デバイス基盤技術の研究開発」 93,172 千円

内閣府・最先端研究開発支援プログラム「省エネルギー・スピントロニクス論理集積回路の研究開発」 603,378 千円

2014 年度

文部科学省受託研究費「耐災害性に優れた安心・安全社会のためのスピントロニクス材料・デバイス基盤技術の研究開発」 83,444 千円

内閣府革新的研究開発推進プログラム (ImPACT) 「スピントロニクス集積回路を用いた分散型 IT システムプロジェクト」 361,570 千円

2015 年度

文部科学省受託研究費「耐災害性に優れた安心・安全社会のためのスピントロニクス材料・デバイス基盤技術の研究開発」 115,778 千円

内閣府革新的研究開発推進プログラム (ImPACT) 「スピントロニクス集積回路を用いた分散型 IT システムプロジェクト」 326,000 千円

日本学術振興会研究拠点形成事業「新概念スピントロニクス素子創製のための国際研究拠点形成」 15,710 千円

2016 年度

文部科学省受託研究費「耐災害性に優れた安心・安全社会のためのスピントロニクス材料・デバイス基盤技術の研究開発」 106,770 千円

内閣府革新的研究開発推進プログラム (ImPACT) 「スピントロニクス集積回路を用いた分散型 IT システムプロジェクト」 834,891 千円

日本学術振興会研究拠点形成事業「新概念スピントロニクス素子創製のための国際研究拠点形成」 16,252 千円

2017 年度

内閣府革新的研究開発推進プログラム (ImPACT) 「スピントロニクス集積回路を用いた分散型 IT システムプロジェクト」 482,000 千円

日本学術振興会研究拠点形成事業「新概念スピントロニクス素子創製のための国際研究

拠点形成」 17,336 千円

5. 国際共同研究・連携研究・連携教育活動の実績

International joint research, collaborative research, and collaborative education

Country	Institute	Subject
Poland	Polish Academy of Science	Electric field control of ferromagnetic semiconductor Electron transport of semiconductor quantum wire
Germany	Max Planck Institute/ Johann Wolfgang Goethe-Universität Frankfurt am Main	Ultrasmall GaAs/AlGaAs Hall sensor
UK	University of York	Optical imaging of spin injection into semiconductor using Kerr-effect microscopy
Switzerland	IBM Research	Spin-orbit interaction in semiconductor quantum well structure
USA	Columbia University	Measurement of muon-spin relaxation in magnetic semiconductor
Australia	University of Sydney	Atopic probe analysis of magnetic semiconductor
Germany	Universität Regensburg	Transport properties of low-dimensional ferromagnetic semiconductor devices
France	Centre national de la recherche scientifique, (CNRS)	Electric-field effect of ferromagnetic films with perpendicular anisotropy
USA	Florida State University	High-sensitivity small Hall sensor
USA	New York University	High-sensitivity small InAs/AlSb Hall sensor
France	Université de Paris-Sud	Sub-nanosecond dynamics of magnetization reversal in magnetic tunnel junction device
USA	UC Davis	Hard X-ray Photoelectron. Spectroscopy of CoFeB/MgO electric-field effect device
Germany	Johannes Gutenberg-Universität Mainz	Structural analysis of magnetic tunnel junction device using Hard X-ray Photoelectron. Spectroscopy
USA	National Institute of Standards and Technology (NIST)	Noise analysis of CoFeB/MgO/CoFeB magnetic tunnel junction device
Sweden	Göteborgs universitet	Spin-torque oscillation of CoFeB/MgO stack structures
India	Indian Institutes of Technology	Fundamental physical properties of small magnetic particles investigated by high-sensitivity small Hall sensor
Singapore	Nanyang Technological University	Ferromagnetic resonance of CoFeB/MgO stack structure
France	Université de Paris-Sud	Numerical analysis of transport properties of ferromagnetic heterostructure using Boltzmann equation
UK	Cambridge	Ferromagnetic resonance of CoFeB/MgO stack structure

6. 共同利用・共同研究拠点活動の実績

Achievements of work done under the framework of Joint Usage/Research Center

1. 電気通信研究所共同研究プロジェクト
H25/B01「非平衡スピン・ゆらぎの精緻な制御と観測による新規ナノデバイスの開拓研究
(研究代表者：野村 晋太郎、通研対応教員：大野英男)」
平成 25 年度～平成 27 年度
2. 電気通信研究所共同研究プロジェクト
H27/B04「固体中のスピン・ダイナミクスの物理と応用」(研究代表者：松倉文礼、通研
対応教員：金井駿)
3. 電気通信研究所共同研究プロジェクト
H28/A16「スピン軌道相互作用の電氣的制御による磁化・スピンドイナミクス操作に関する
研究」(研究代表者：好田誠、通研対応教員：金井駿)
4. 電気通信研究所共同研究プロジェクト
H28/B01「電荷とスピンの制御に基づく精密物性科学の構築とデバイス応用 (研究代表
者：小林研介、通研対応教員：深見俊輔)」
5. 電気通信研究所共同研究プロジェクト
H29/A04「超高感度核スピン計測で探るスピントロニクス材料のナノ物性(研究代表者：
佐々木進、通研対応教員：深見俊輔)」
6. 電気通信研究所共同研究プロジェクト
H29/B15「新規固体デバイス・回路を用いた脳型コンピューティングに関する研究 (研究
代表者：深見俊輔、通研対応教員：深見俊輔)」
7. 電気通信研究所共同研究プロジェクト
H30/A07「光-スピン変換を利用した半導体中のスピン制御に関する研究」(研究代表者：
石原淳、通研対応教員：金井駿)
8. 電気通信研究所共同研究プロジェクト
H30/A36 “Effect of sample geometry on the damping mechanism of CoFeB magnetic thin films
with perpendicular easy axis using vector-network-analyzer ferromagnetic resonance
spectroscopy” (PI: Eli Christopher Inocencio Enobio, 通研対応教員：深見俊輔)

7. 研究教育指導 / Research supervision

(ア) 担当講義リスト / List of lectures

- 東北大学全学教育
基礎ゼミ (深見俊輔)
未来の電子・通信・情報 (大野英男)
- 東北大学工学部
創造工学研修 (大野英男、深見俊輔、金井駿)
- 東北大学工学部電気情報物理工学科
電磁気学 I (大野英男、深見俊輔)
電磁気学 I 演習 (大野英男、深見俊輔、金井駿)

電気・通信・電子・情報工学実験 A (金井駿)
 電気・通信・電子・情報工学実験 B (金井駿)
 電気・通信・電子・情報工学実験 D (金井駿)
 アドバンスト創造工学研修 (深見俊輔、金井駿)

- 東北大学大学院工学研究科博士前期課程
 スピン機能素子 (大野英男、深見俊輔)
- 東北大学大学院工学研究科博士後期課程
 先端超高周波情報工学 (大野英男、深見俊輔)
 先端スピン工学特論 (大野英男、深見俊輔)
 電子デバイス工学特論 (大野英男、深見俊輔)
- 東北大学 学際高等研究教育院 融合領域研究合同講義 (大野英男)
- TSSP (Tohoku University Science Summer Program) (大野英男)
- 筑波大学大学院数理物質科学研究科
 最先端ナノ物性・ナノ工学特論 (非常勤講師) (深見俊輔)

(イ) 学位取得者リスト

List of bachelor's, master's and doctoral degree students supervised

学位	氏名	論文題目	取得年月	担当
修士	石川 慎也	Co/Pt 多層膜-CoFeB 積層電極を用いた磁気トンネル接合に関する研究	2013.09	主査
博士	水沼 広太郎	磁気トンネル接合における強磁性共鳴と電流誘起磁化反転に関する研究	2013.09	主査
学士	伊藤也真人	強磁性薄膜の磁気異方性の評価手法に関する研究	2014.3	主査
学士	ジャン ハン	磁気トンネル接合における閾値電流と磁気特性の接合サイズ依存性	2014.3	主査
学士	平山 絵里子	ホモダイナ検出強磁性共鳴法による微細磁気トンネル接合素子の磁気特性評価	2014.3	主査
学士	渡部 杏太	CoFeB-MgO 積層膜における磁気特性の磁性層厚依存性	2014.3	主査
修士	近江 宗行	磁性体ナノドットの作製とスピンドYNAMIXに関する研究	2014.3	副査
修士	鹿原 和樹	γ' -Fe ₄ N 型 3d 遷移金属窒化物薄膜の合成とその磁気抵抗効果	2014.3	副査
修士	矢田 祐基	垂直磁化膜を用いたナノ接点スピントルクオシレータに関する研究	2014.3	副査
修士	渡辺 誉	Pt 添加と高温アニールによるナノ接点の MR 特性および電気特性の改善に関する研究	2014.3	副査
修士	小林 健悟	ミリ波応用を目指した GaN 系高電子移動度トランジスタの高速化及び高出力化の研究	2014.3	副査
修士	芳 斌	Uniaxial Magnetocrystalline Anisotropy in Body Centered Tetragonal Alternate Monatomic [Fe/Co] _n Superlattices (単原子層積層 [Fe/Co] _n 体心正方人工格子の一軸	2014.3	副査

		結晶磁気異方性に関する研究)		
修士	佐藤 祐司	高温動作可能な電界操作型磁気デバイスの開発に向けた磁気異方性の制御に関する研究	2014.3	副査
修士	武藤 好昭	ダイヤモンド窒素欠陥中心における単一電子スピンのマイクロ波量子操作の研究	2014.3	副査
修士	張 超亮	強磁性ヘテロ構造における面内電流誘起有効磁場に関する研究	2014.3	主査
博士	石原 淳	半導体量子構造におけるスピンの時空間ダイナミクスに関する研究	2014.3	主査
博士	金井 駿	強磁性金属薄膜における電界による磁化制御に関する研究	2014.3	主査
博士	鄭 鎮源	Studying Interfacial Specific Resistance of Fe(001)/Ag (001) Interface and Effective Way to Enhance the MR Output in CPP-GMR Device (Fe/Ag (001) 界面抵抗の研究と CPP-GMR デバイスの MR 出力の効果的増大法に関する研究)	2014.3	副査
修士	都澤 章平	ドナーを共添加した強磁性半導体の作製と物性評価	2014.9	主査
修士	岡田 篤	強磁性薄膜の電界による磁気特性の変調と強磁性共鳴法による検出	2014.9	主査
修士	鄭 重	Study on Peculiar Electro-Transport Property of Nano-Contacts Magnetoresistive Devices (ナノ接点磁気抵抗素子の特異な電気輸送特性に関する研究)	2014.9	副査
博士	ベルムバーリク モハマド	Study on Magneto- and Electro-Transport Properties of Wurtzite-MgZnO Tunnel Barrier Prepared by Molecular Beam Epitaxy (分子線エピタキシー法で作製したウルツ鉱型 MgZnO トンネルバリアの磁気・電気輸送特性に関する研究)	2014.9	副査
博士	荻谷 隆	スピントロニクス不揮発性ロジック向け高性能パッケージに関する研究	2014.9	副査
博士	崎村 昇	3 端子 MTJ 素子による混載 MRAM 回路技術とその不揮発性集積システム応用に関する研究	2014.9	副査
博士	本庄 弘明	3 端子スピントロニクス素子のドライエッチングプロセスに関する研究	2014.9	主査
学士	橋本 祥斉	CoFeB-MgO 接合における磁気緩和定数の電界変調の膜厚依存性	2015.3	主査
学士	佐藤 由彬	磁気トンネル接合用 Co/Au 多層膜構造と磁気異方性	2015.3	主査
学士	大嶋 直樹	CoFeB-MgO 磁気トンネル接合におけるスイッチング確率の電流パルス幅依存性	2015.3	主査
学士	岩渕 透	強磁性細線における電流誘起磁壁移動の細線幅・膜厚依存性	2015.3	主査
修士	戸田 裕介	ナノ接点磁気抵抗素子を用いた高出力・高周波数スピントルク発振に関する研究	2015.3	副査
修士	竹内 祐太郎	CoFeB-MgO 磁気トンネル接合の熱安定性と閾値電流の温度依存性	2015.3	主査
修士	久保田 修司	CoFeB-MgO 磁気トンネル接合における電流誘起高速磁化反転	2015.3	主査
修士	笈田 陸弘	電気磁気効果材料 Cr2O3/強磁性積層膜の界	2015.3	副査

		面磁気特性に関する研究		
修士	春日 聡志	電磁共鳴アンテナを用いたスピントルクオシレータの無線信号伝送に関する研究	2015. 3	副査
修士	佐藤 秀幸	強磁性金属下地層上に成膜したウルツ鉱型MgZnO 薄膜の電気輸送特性	2015. 3	副査
修士	大内田 聡	STT-MRAM の高集積化・高速動作へ向けた Perpendicular Magnetic Tunnel Junction スイッチング過渡特性の研究	2015. 3	副査
修士	坂本 圭弥	Rh/FeCo 垂直磁化膜を用いたナノ接点磁気抵抗素子の面直スピントルク発振に関する研究	2015. 3	副査
修士	陳 寅	酸化物/強磁性体界面の垂直磁気異方性に関する研究	2015. 3	副査
修士	畠山 信也	InAlN バリア層による GaN 系高電子移動度トランジスタの高性能化	2015. 3	副査
修士	堀川 喜久	FeB 強磁性電極を用いた磁気トンネル接合	2015. 3	主査
博士	下村 直樹	室温動作電界制御磁気デバイスの実現に向けた動作温度向上に関する研究	2015. 3	副査
博士	芦田 拓也	電気磁気効果を用いた磁化の電界操作に関する研究	2015. 3	副査
博士	但木 大介	有機半導体の分子ドーピングと有機トランジスタへの応用に関する研究	2015. 3	副査
修士	篠原 遼太	CoFeB/MgO 接合における強磁性共鳴スペクトルのマイクロ波パワー依存性	2016. 9	主査
修士	渡部 杏太	CoFeB-MgO 構造の磁気特性の熱処理条件依存性	2015. 9	主査
学士	五十嵐 純太	異なる断面構造を有する磁気トンネル接合の磁化反転	2016. 3	主査
学士	大河原 綾人	Ta/W チャネルを用いたスピン軌道トルク磁化反転	2016. 3	主査
学士	篠崎 基矢	微細磁気トンネル接合のダンピング定数の評価	2016. 3	主査
学士	高平 寛之	Co/Pt 多層膜系磁気トンネル接合用参照層構造における磁氣的・電氣的特性の挿入層材料依存性	2016. 3	主査
修士	姉川 哲朗	面内磁化容易軸を有する新規 3 端子素子構造におけるスピン軌道トルク磁化反転	2016. 3	主査
修士	平山 絵里子	磁化ダイナミクスによる微細磁気トンネル接合の特性評価	2016. 3	主査
修士	佐々木 麻季	自然酸化(Mg, Al)-O 障壁層を用いた強磁性トンネル接合膜の作製とその磁化抵抗効果	2016. 3	副査
修士	酒井 康貴	(Al, Ti)-N 障壁層を用いた強磁性トンネル接合膜の作製とその磁気抵抗効果	2016. 3	副査
学士	金村 卓郎	PtMn/[Co/Ni]積層膜におけるスピン軌道トルクの評価	2016. 9	主査
博士	石川 慎也	高熱安定性を有する微細磁気トンネル接合に関する研究	2016. 9	主査
博士	S. DuttaGupta	Current-Driven Dynamics of Magnetic Domain Wall in Ultrathin Metallic Structures	2016. 9	主査
学士	斎野 高遥	垂直磁化容易 CoFeB-MgO 磁気トンネル接合の書き込みエラーレート測定	2017. 3	主査
学士	高橋 佑	スピン軌道トルク磁化反転特性の面内磁化容易軸角度依存性	2017. 3	主査
学士	王 子超	磁界変調ホモダイン強磁性共鳴法によるナ	2017. 3	主査

		ノ磁性体の評価		
修士	岩渕 透	強磁性ナノ細線における電流誘起磁壁移動	2017.3	主査
修士	土肥昂堯	CoFeB-MgO 接合における交換ステイフネスの電界効果	2017.3	主査
修士	大友 康寛	MTJ/CMOS Hybrid 混載メモリとその管理システムによるマイクロ・コントローラ・ユニットの低消費電力化に関する研究	2017.3	副査
修士	佐々木 太郎	3次元縦型 BC-MOSFET を用いた 1T-1MTJ STT-MRAM セルの高密度・低消費電力化に関する研究	2017.3	副査
修士	大島直樹	CoFeB-MgO 磁気トンネル接合における電気的手法を用いた高速磁化反転	2017.3	主査
博士	張 超亮	ナノスケール重金属/強磁性金属ヘテロ構造におけるスピン軌道トルク誘起磁化反転に関する研究	2017.3	主査
博士	チョン ジュノ	Study about the degradation mechanism of the magnetic tunnel junctions (MTJs) during the patterning process and its recovery by using the oxygen showering post-treatment (OSP) process	2017.3	副査
修士	五十嵐 純太	微細 CoFeB/MgO 垂直磁気トンネル接合における磁化反転の構造依存性	2017.9	主査
修士	W. A. Borders	Characterization of Analog Spin-Orbit Torque Devices for Artificial Neural Networks	2017.9	主査
博士	岡田 篤	界面異方性を有する磁性薄膜における磁化ダイナミクスとその電界効果に関する研究	2017.9	主査
学士	宮坂奎伍	スピン軌道トルク磁化反転のエラーレートの評価	2018.3	主査
学士	古屋海渡	W/CoFeB/MgO 積層構造におけるスピン軌道トルクの W 低効率依存性	2018.3	主査
学士	舩津拓也	[MgO/FeB]多層膜における磁気異方性の MgO 膜厚依存性	2018.3	主査
学士	古賀嵩祥	ナノスケールアナログスピン軌道トルクの実現に向けたグラニューラ積層膜の検討	2018.3	主査
修士	市川 直樹	Ta/CoFeB/MgO 積層構造における交換ステイフネスの CoFeB 膜厚依存性とその電界効果	2018.3	主査
修士	齊藤 節	Magnetic Tunnel Junction の熱安定性係数の高速かつ高精度な評価技術に関する研究	2018.3	副査
修士	篠崎 基矢	強磁性共鳴を用いた微細磁気トンネル接合における磁気特性の評価	2018.3	主査
博士	A. Kurenkov	Spin-Orbit Torque Controlled Antiferromagnet/Ferromagnet Heterostructures for Nonvolatile memory and Neuromorphic Computing	2018.3	主査
博士	大内田聡	Study on Transient Phenomenon of Magnetic Tunnel Junction with Perpendicular Anisotropy and Array Design for High Density and High Speed Operation STT-MRAM	2018.3	副査
学士	De Zoysa Karunathilaka Vihanga	Composition dependence of spin-orbit torque in Pt _{1-x} Mn _x /CoFeB heterostructures	2019.3	主査
学士	奥田 峻太郎	微細磁気トンネル接合向け規則合金薄膜の作製と評価	2019.3	副査
修士	伊藤 隆一	PtMn/CoFeB 積層構造におけるスピン軌道ト	2019.3	主査

		ルクの評価		
修士	齋野 高遥	垂直磁化容易磁気トンネル接合における電流誘起磁化反転エラーレート の測定及びマクロスピンモデルとの比較	2019.3	主査
修士	高橋 佑	プレーナーホール効果を用いた面内磁化スピン軌道トルク素子の特性評価	2019.3	主査
修士	王子超	MgO/(Co)FeB/MgO 磁気トンネル接合の強磁性共鳴と電流誘起磁化反転	2019.3	主査
博士	渡部 杏太	垂直磁化容易軸を有する 1X/Xnm 極微細磁気トンネル接合の材料・素子技術に関する研究	2019.3	主査

8. 叙勲・受賞・表彰 / Honors, awards, and prizes

<大野英男教授>

- 2013 American Physical Society (APS)フェロー
- 2014 電子情報通信学会・エレクトロニクスソサイエティ賞
- 2015 応用物理学会化合物半導体エレクトロニクス業績賞 (赤崎勇賞)
- 2016 DPS Paper Award
- 2016 江崎玲於奈賞
- 2016 C&C 賞
- 2017 文部科学省・科学技術分野の文部科学大臣表彰科学技術賞
- 2018 Institute of Electrical and Electronics Engineers (IEEE) フェロー

<深見俊輔准教授>

- 2013 RIEC Award 東北大学研究者賞
- 2014 船井研究奨励賞
- 2015 応用物理学会講演奨励賞
- 2015 文部科学大臣表彰 科学技術部門 若手科学者賞
- 2015 原田研究奨励賞
- 2016 DPS Paper Award
- 2017 2nd ImPACT International Symposium, Best Poster Award
- 2017 青葉工学振興会賞
- 2018 Asian Union of Magnetism Societies, Young Researchers Award
- 2018 平成 30 年度通研研究交流会 優秀発表賞
- 2018 日本磁気学会 優秀研究賞
- 2019 田中貴金属記念財団 2018 年度「貴金属に関わる研究助成金」ゴールド賞

<金井駿助教>

- 2013 応用物理学会講演奨励賞受賞
- 2014 応用物理学会 英語講演奨励賞受賞
- 2014 エヌエフ基金 研究開発奨励賞受賞
- 2014 RIEC award 東北大学学生賞
- 2015 青葉工学研究奨励賞

- 2016 船井研究奨励賞
- 2016 原田研究奨励賞
- 2017 井上研究奨励賞
- 2017 安藤博記念学術奨励賞
- 2018 平成 30 年度通研研究交流会 優秀発表賞

<博士研究員、学生>

- 2013 応用物理学会英語講演奨励賞 (Samik DuttaGupta)
- 2014 第 8 回東邦大学複合物性研究センターシンポジウム「機能性材料の最前線」 ベストポスター賞 (平山絵里子)
- 2016 東北大学総長賞 (平山絵里子)
- 2016 RIEC Award 東北大学学生賞 (Samik DuttaGupta)
- 2016 応用物理学会英語講演奨励賞 (張 超亮)
- 2017 応用物理学会講演奨励賞 (William Andrew Borders)
- 2017 応用物理学会英語講演奨励賞 (William Andrew Borders)
- 2019 Best Poster Award in the 21st International Conference on Magnetism (ICM2018) (渡部杏太)
- 2019 Best Poster Award in the 2nd Symposium for World Leading Research Centers (Aleksandr Kurenkov)
- 2019 東北大学工学研究科長賞 (渡部杏太)

9. その他 / Others

おもな人材育成 (2013 年度～2018 年度)

氏名	職歴
水沼 広太朗	日本学術振興会特別研究員
石原 淳	日本学術振興会特別研究員
金井 駿	日本学術振興会特別研究員→東北大学電気通信研究所助教
張 曉文	東北大学電気通信研究所研究生→Institute of Astronomy and Astrophysics, Taiwan, Supporting Engineer
S. DuttaGupta	文部科学省国費外国人留学生 (大使館推薦)→東北大学大学院工学研究科博士課程後期進学→東北大学スピントロニクス学術連携研究教育センター教育研究支援者→東北大学先端スピントロニクス研究開発センター助教
Eli C. I. Enobio	東北大学省エネルギー・スピントロニクス集積化システムセンター産学官連携研究員→Mindanao State University-Iligan Institute of Technology 教授
中山裕康	日本学術振興会特別研究員 (PD) →慶應義塾大学理工学部特任助教
石川慎也	日本学術振興会特別研究員
A. Kurenkov	文部科学省国費外国人留学生 (大学推薦)→東北大学大学院工学研究科博士課程後期進学→東北大学先端スピントロニクス研究開発センター博士研究員
都澤章平	日本学術振興会特別研究員
張 超亮	日本学術振興会特別研究員→東北大学省エネルギー・スピントロニク

	ス集積化システムセンター博士研究員→東北大学学際科学フロンティア研究所
W. A. Borders	文部科学省国費外国人留学生（大学推薦）→東北大学大学院工学研究科博士課程後期進学→日本学術振興会特別研究員
岡田 篤	日本学術振興会特別研究員
石川慎也	日本学術振興会特別研究員
渡部杏太	日本学術振興会特別研究員
岡田 篤	日本学術振興会特別研究員
五十嵐純太	日本学術振興会特別研究員
竹内祐太郎	日本学術振興会特別研究員