SEONGTAE BAE, Ph. D

UNIVERSITY OF SOUTH CAROLINA, COLUMBIA, USA
Department of Electrical Engineering

PERSONAL DATA

Name:	Seongtae Bae
Current Appointment:	Assistant Professor
Address:	Department of Electrical Engineering, 301 Main Street, Swearingen Hall, 3A31, Columbia, SC, 29208, USA
Phone:	1-803-636-6167 (Cellular), 1-803-777-3469 (Office)
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RESEARCH INTERESTS

- **Magnetic Nanofluid Hyperthermia and its Clinical Applications in Nanomedicine**
- **Nanomagnetic Biomaterials and Ferrite Nanoparticles/Nanofluids for Biomedical Applications**
- **Nano-/Microstructure Magnetic Biosensors and BioMEMS for Bioelectronics**
- **Extremely Low Frequency Electromagnetic Devices for Therapeutics and Healings**
- **Bioelectromagnetism and Bioelectricity for Neural Engineering and Neuromodulation**
- **Bioinstrumentation/Medical Electronics & Devices for Neurodegenerative Diseases**
- **Nano-scale Spintronics Structures and Devices for Active/Passive Digital/Analog Electronics**
- **Nanostructure Magnetic/Electronic Thin Films and Devices**
- **Designing and Processing of Materials for Spintronics and SpinBiotronics**
- **Bioelectric/Spintronic Based Hybrid Power Generators for Energy Sustainability**

BACKGROUND

EDUCATION

- **Ph. D. in Electrical and Computer Engineering (2003), April, 2003**
  University of Minnesota at Twin Cities, Minnesota, USA
  Advisor: Prof. Jack H. Judy

- **M.E. in Electronic Materials Engineering (1995), Feb., 1995**
  Kwangwoon University, Seoul, Korea
  Advisor: Prof. Jin Young Kim
  M.E. in Academic-Research Institute Co-Training Program at Division of Metals
  Korea Institute of Science and Technology (KIST), Seoul, South Korea
  Advisor: Dr./Prof. Kyungho Shin

- **B.E. in Electronic Materials Engineering (1993), Feb., 1993**
  Kwangwoon University, Seoul, South Korea

PROFESSIONAL APPOINTMENTS

PAID WORK EXPERIENCE (PROFESSIONAL EXPERIENCE)

Assistant Professor
University of South Carolina, College of Engineering and Computing/ Dept. of Electrical Engineering, 301 Main St., Swearingen Hall, Columbia, SC, 29208, USA
Phone: 1-803-777-7890

Employment Period: Aug. 16, 2015 ~ Present
Hours per week: 40
Supervisor: Prof. Roger Dougal
Duties: Teach both undergraduate and graduate students in the areas of introduction to semiconductors, biomedical sensors and bioelectronics engineering. In addition, supervise graduate/undergraduate students by focusing the researches on the applied biomedical electronics such as biosensors, bioinstrumentation, and development of new type of nanostructure biomaterials for imaging and therapeutics targeting for nano-/biomedicine.

Research Associate Professor
Seoul National University, College of Medicine/ Dept. of Neurosurgery, 101 Daehak Ro, Jong Ro Gu, Seoul, 110-744, KOREA
Phone: (+82)-2-3668-7408

Employment Period: December 21, 2013 ~ July 31, 2015
Hours per week: 40
Supervisor: Prof. Sun Ha Paek

Duties: Conduct researches in the field of hyperthermia for malignant brain tumors and to design and fabricate prosthetics devices for neuromodulations such as DBS (Deep Brain Stimulation) and neurodigenerative diseases. In addition, partially involve in teaching graduate students in the area of bioelectronics and biomaterials.

Assistant Professor
National University of Singapore, College of Engineering/ Dept. of Electrical and Computer Engineering, 5 Engineering Drive 4, Singapore, 117576 SINGAPORE
Phone: (+65)6551-2103

Employment Period:	July 31, 2004 ~ June 30, 2013
Hours per week:	40
Supervisor:	Prof. Daniel Chun

Duties: Teach both undergraduate and graduate students in the areas of general electronics, electrical engineering, spintronics, biomedical sensors, and bioelectromagnetics & electrophysiology (bioelectricity). In addition, supervise graduate students as a lab supervisor of Biomagnetics Laboratory (BML) and one of PIs in Information Storage Materials Laboratory (ISML) by focusing the researches on the applied nanaspintronics and biomedical electronics such as biosensors, bioinstrumentation, and development of new type of nanostructure biomaterials for imaging and therapeutics targeting for nano-/biomedicine.

Director (Executive Director)
Nuri Vista Co. Ltd., Center for Nano Business/ Division of Nano-Bio Research, 11-77, Songdo Dong, Yeonsu Gu, Incheon, 406-840, KOREA
Phone: (+82) 70-8852-3703

Employment Period:	Jan 01, 2011 ~ April 30, 2012
Hours per week:	40
Supervisor:	Dr. Chung, Kyoung Won/Mr. Cho Song Man

Duties: Create and develop new research projects relevant to the applications of superparamagnetic ferrite nanoparticles and colloidal suspension (nanofluids) for biomedicine/nanomedicine. T2 MRI contrast agent, Nanotheranostic agents for MRI guided magnetic hyperthermia, development of various nano thermal medicine based on magnetic nanofluid hyperthermia, and nano-structure in-vitro biosensors for extremely low concentration of biomolecules were mainly conducted under my direction.

Internship Researcher
Seagate Technology, Electrical Device Verification Team, 7801 Computer Ave, Bloomington, MN 55435, USA
Phone: (+1) 952-402-8000

Employment Period:	June 01, 2011 ~ September 01, 2011

Hours per week: 40
Supervisor: Dr. I-Fei Tsu

Duties: Conduct research on the electrical and magnetic stability of TMR (Tunneling Magnetoresistance) read sensors targeting for 1 Tbit/in^2 of recording density. My primary contribution was to design electromigration and intrinsic/extrinsic dielectric breakdown of TMR sensors under different accelerated conditions such as high current density, different bias voltage, different applied magnetic field conditions, and different vapor & temperature conditions that are similar to the real operating conditions of TMR read sensors.

Research Assistant
University of Minnesota, College of Engineering/ Dept. of Electrical and Computer Engineering/The center for Micromagnetics and Information Technology (MINT), 200 Union St SE, Minneapolis, MN 55454, USA
Phone: (+1) 612-625-9094

Employment Period: September 15, 1998 ~ January 14, 2003
Hours per week: 20 (50 % RA)
Supervisor: Prof. Jack H. Judy

Duties: Conduct research on magnetic thin films and their applications to different kinds of metallic based nanospintronics devices and magentoelectronics. Exchange coupling at the interface between magnetic and anti-ferromagentic layers for GMR (Giant Magnetoresistance)spin valve devices, development of a new type of pseudo spin valve magnetic random access memory (MTAM), spin logic devices based on GMR devices, GMR spin-valve amplifiers and switchers, and the electrical reliability of GMR/TMR sensors were mainly conducted during working in this period under the different financial support from federal governments and industrial funds.

Teaching Assistant
University of Minnesota, College of Engineering/ Dept. of Electrical and Computer Engineering, 200 Union St SE, Minneapolis, MN 55454, USA
Phone: (+1) 612-625-9094

Employment Period: December 10, 1997 ~ September 14, 1998
Hours per week: 20 (50 % TA)
Supervisor: Prof. Jack H. Judy

Duties: Teach undergraduate students in recitation class as well in office hour. In addition, help lectures to mark scripts and grade. I involved in working as a TA for "Electromagentics", and "Seminconductor materials and devices" undergraduate courses for two semesters.

Research Scientist
Korea Institute of Science and Technology (KIST), Division of Metals, 5-Hwarang-ro 14-gil, Seong Buk Gu, Seoul, 136-791, KOREA

Phone: (+82) 2-958-5114

Employment Period:	November 01, 1993 ~ July 01, 1996
Hours per week:	40
Supervisor:	Dr./Prof. Kyung Ho Shin

Duties: Involved in conducting three research projects: 1) the development of new type of exchange biased metallic Giant Magnetoresisance (GMR) spin-valve read sensors for 100 G/in2 recording density, 2) development of multi-layered thin film capacitors, and 3) circuit designing and fabrication of dual type of C-MOS (complementary-Metal Oxide Semiconductor) for current mirror amplifiers.

NON-SALARIED WORK EXPERIENCE (PROFESSIONAL EXPERIENCE)

Visiting Professor
Seoul National University, College of Medicine/ Dept. of Neurosurgery, 101 Daehak Ro, Jong Ro Gu, Seoul, 110-744, KOREA
Phone: (+82)-2-3668-7408

Employment Period:	July 01, 2013 ~ December 20, 2013
Hours per week:	40
Supervisor:	Prof. Sun Ha Paek

Duties: Conduct collaborative research in the area of magnetic nanofluid hyperthermia for treating malignant brain tumors. Designing of AC magnetic coils and optimization of new type of nanofluid hyperthermia agents were mainly carried out in this time period.

(Executive) Director
WaveRider Inc., Biomagnetics and Spintronics Division, 19498 Edelweiss Dr., MN 56467, USA
Phone: (+1) 612-599-5128

Employment Period:	April 01, 2003 ~ June 01, 2004
Hours per week:	40
Supervisor:	Dr. Shayne Zurn

Duties: Conduct research on the development of in-vitro GMR biosensors for detecting HPV (Human Pappiloma Virus) to diagnose cervical cancer, which is one of the fetal diseases for women's death in USA. My main duty in this research project was to design a sensor structure with a specially designed keeper layer and fabricate the GMR sensors with biomembrane sensor surface, which allows for attaching bio-probes.

AWARDS (HONORS) AND RECOGNITION

- **"Best Poster Paper Award"**, 55th Magnetism and Magnetic Materials Conference (MMM), Atlanta, GA, USA (2010)
- **Editorial committee member, IETECH (International Engineering and Technology)** (2007 ~

Present)

- **"Marques Who's Who in Engineering Higher Education",** List name and biography as an electrical engineer in USA (2006)
- **"Marques Who's Who in America",** List name and biography as an electrical engineer in USA (2004)
- **"Marques Who's Who in America",** List name and biography as an electrical engineer in USA (2003)
- **"Young Researcher Award",** International Conference on Ferrite 8, 2000, Kyoto, JAPAN (2000)
- **"Student Travel Award",** International Conference on Ferrite 8, 2000, Kyoto, JAPAN (2000)
- **"Student Travel Award",** Symposium on Magneto-electronic Devices, 2000, Iowa, USA (2000)

PRINCIPAL ACCOMPLISHMENTS

RESEARCH HIGHLIGHTS (2005 – Present)

- **Spotlight News at the "YTN News", KOREA,** http://never.me/53w7UmJs (Oct. 26th, 2017), "Induction Technology Development Raises, "Heat Shock Protein", Possible Glaucoma Treatment"
- **Spotlight News at the "YTN News", KOREA,** http://naver.me/x7MKb0UE (Nov. 5th, 2017), "More Powerful Hyperthermia Treatment" Discovered"
- **"Best Poster Paper Award"**, 55th Magnetism and Magnetic Materials Conference (MMM), Atlanta, GA, **USA** (Nov. 2010), "Enhancement of perpendicular exchange bias in [Pd/Co]/FeMn thin films by tailoring the Magnetoelastically-induced perpendicular anisotropy"
- **Spotlight News at the** "**Nanowerk**", **USA**, http://www.nanowerk.com/spotlight/spotid=18646.php (Oct. 2010), "A Nanomedicine approach for ocular neuroprotection in glaucoma**"**
- **Transferring** "**MRAM technology based on perpendicularly magnetized pseudo spin-valves**"**, to the A-STAR (Singapore government), SINGAPORE** (May 2009)
- **Transferring "Magnetic Biosensor Technology" to the LG Micron Co. KOREA** (Mar. 2009) "Development of an in-vitro TMR based cancer warning biosensor with immobilized DNA coated Co-ferrite Nanoparrticles"
- **Spotlight News at the** "**Nanowerk**", **USA**, www.nanowerk.com/spotlight/spotid=1308.php (Jan. 2007) "Self-heating nanoparticles as tumor-destroying hyperthermia agents**"**
- **Research highlight news at the "Nanoscience and Nanotechnology World**", **JAPAN** (Jan. 2007) **Research highlight news at the "Nanoweekly", KOREA** (Feb. 2007) "In-vivo hyperthermia using magnetic nanoparticles for necrotizing cancer tumors"

PATENTS

- **Seongtae Bae**, and Jung-tak Jang, "IRON OXIDE NANOPARTICLES DOPED WITH ALKALI OR ALKALI EARTH METAL CAPABLE OF HUGE SELF-HEATING IN THE BIOCOMPATIBLE MAGNETIC FIELD AND PREPARATION METHOD THEROF", *Applied*, KOREA, Patent No. 10-2017-0092955, (2017)
  1) KOREA, PCT/KR2009/007801
  2) USA, PCT/13/141,844
  3) JAPAN, PCT/2011-543434
  4) EUROPE, PCT/2011/234291
  5) CHINA, PCT/200980152546.6

- **Seongtae Bae,** Sun Ha Paek, Yeong Deuk Seo, and Jung-Tak Jang, "DEVICE FOR ALTERNATING CURRENT MAGNETIC FIELD-INDUCED HYPERTHERMIA", *Applied*, KOREA, Patent No. KR 10-2016-0043392, (2016)

- **Seongtae Bae**, Minhong Jeun, and Sun Ju Chun
  "COATING METHOD OF SUPERPARAMAGNETIC NANOPARTICLES FOR BOTH ULTRA HIGH SENSITIVE MRI CONTRAST AGENT AND NANO-THERAGNOSIS AGENT APPLICATIONS, AND COATED SUPERARAMAGNETIC NANOPARTICLES AND COATED SUPERARAMAGNETIC NANOPARTICLE AGENTS USING THE METHOD" *Published*, KOREA, No. KR 10-2012-0115504, and *In preparation (USA Patent)*, (2013)

- **Seongtae Bae**, Minhong Jeun, and Sun Ju Chun
  "FERRITE-BASED SUPERPARAMAGNETIC NANOPARTICLE HAVING ULTRA HIGH AC MAGNETICALLY-INDUCED HEAT GENERATION ABILITY AND HIGH SPECIFIC LOSS POWER, PREPARATION METHOD THEREOF, AND THERMOABLATION AGENT COMPRISING SAME", *Published*, KOREA, No. KR 10-2012-0078220, and *In preparation (USA Patent)*, (2013)

- **Seongtae Bae**, and Kyung-Won Chung
  "THE PREPARATION METHOD OF ENGIEERED SUPERPARAMAGNETIC Mg-FERRITE NANNOPARTICLE AND ITS BIOMEDICAL USE", *Published*, KOREA, Patent No. KR 10-2008-0133348, (2012)

- **Seongtae Bae**, and Kyung-Won Chung
  "METHOD FOR PREPARING ENGINEERED Mg DOPED FERRITE SUPERPARAMAGNETIC NANO PARTICLE EXHIBITING AC MAGNETIC INDUCTION HEATING AT HIGH TEMPERATURE 0 AND Mg-DOPED FERRITE SUPERPARAMAGNETIC NANO PARTICLES ENGINEERED BY THE METHOD", *Applied (under review)*, (2012)
  1) KOREA, PCT/KR2009/007801
  2) USA, PCT/13/141,844
  3) JAPAN, PCT/2011-543434
  4) EUROPE, PCT/2011/234291
  5) CHINA, PCT/200980152546.6

- **Seongtae Bae**, Sanghoon Lee, and Sun Ju Chun
  "DOUBLE-LAYER METAL THIN FILM TYPE ELECTRIC POWER GENERATOR, AND INTEGRATED ELECTRIC POWER GENERATOR USING SAME", *Published*, (2012)
  1) KOREA, Patent No. KR 10-2010-0077334
  2) PCT/KR2011/005903 (JAPAN, USA, and CHINA)

- **Seongtae Bae**, Minhong Jeun, Ki Ho Park, Jin Wook Cheoung, and Sun Ju Chun

"MATERIALS TO INDUCE HEAT SHOCK PROTEINS FOR OCULAR NEUROPROTECTION AND THEIR INFUSION TECHNIQUE TO THE RETINA", *Published*, KOREA, Patent No. KR 10-2010-0069555, (2012)

- Jeong Ryul Kim, Jang-Kwon Lim, Hee Sun Kim, Mun Suk Kang, **Seongtae Bae**, Wook Sun Kim, and Sang Won Lee
  "MAGNETORESISTIVE THIN FILM SENSOR PREVENTING DEGRADATION OF SENSOR FUNCTION ACCORDIGN TO ABNORMAL OPERATION", *Published*, KOREA, Patent No. KR 10-2007-0080628, (2009)

- **Seongtae Bae**, Sang Won Lee, and Chul Sung Kim
  "A METHOD FOR PREPARING A MAGNETIC NANOPARTICLE AND SYNTHESIZED NANOPARTICLES USING THE METHOD", *Published*, KOREA, Patent No. KR 10-2006-0777341, (2007)

RESEARCH GRANTS (2005 – Present)

- "Development of alkali metals and alkali earth metal ions doped γ-Fe2O3 superparamagnetic nanoparticles with colossal intrinsic loss power and exceptionally high r2-relaxivity of MR imaging for cancer "Nanotheranosis"", Neo-Nanomedics-Korea Co. Ltd., SOUTH KOREA, **PI**, (Jan. 25th 2018 ~ Jan. 24th, 2020), **USD $ 900,000**

- "Superparamagnetic ferrite nanofluids with exceptionall y high r2-relaxivity for single molecular imaging and highly efficient cell tracking in tissue engineering" NSF-South Carolina Experimental Program to Stimulate Competitive Research (EPSCO), **Participant PI**, (Jan. 01 ~ June 30th 2016), **USD $ 100,000**

- **"**Synthesis of superparamagnetic nanoparticles and its applications in biomedicine", Start-up funding from College of Engineering and Computing, USC, **PI**, (Aug. 2015 ~ July 2018), **USD $ 260,000**

- "A new electrical magnetic thin film power generator and its integration in nano-scale for a renewable energy system", PUROTECH Co. Ltd., SOUTH KOREA, **PI**, (Dec. 1st 2012 ~ June. 30th 2013), **USD $ 254,450.0**

- "Integrative Program on Commercialization of Nanomedicine & Theranosis Modalities for glaucoma, neural diseases (Perkins's disease, Epilepsy, & Brain strokes) and cancers (glioblastoma, Hepatic cancer, and Lung cancer) using magnetic nanoparticles and smart magnetoelectronics technologies", Nuri-Vista Co. Ltd., SOUTH KOREA, **PI & Program Leader**, (Jan. 1st 2011 ~ Apr. 30th 2012), **USD $ 5,124,338.8**

- "Engineered superparamagnetic nanoparticles for neuroprotection – Modulation of intraocular nanoparticle delivery to optic nerve", Seoul National University of Hospital (SNUH), SOUTH KOREA, **Co-PI**, (Apr. 2010 ~ Mar. 2011), **USD $ 30,000.0**

- "CCP-CPP GMR spin-valve read sensors with Fe_3O_4 nanoparticle insertion for 10 Tbit/in^2 recording density (I)", Daion Co. Ltd., SOUTH KOREA, **PI**, (Jan. 2009 ~ Jan. 2014), **USD $ 787,826.0**

- "Integrative program of nanomedicine through development, translation and clinical applications", Seoul National University of Hospital (SNUH), SOUTH KOREA, **Co-PI**, (July 2009 ~ June 2011), **USD $ 128,795.0**

- "Induction of ocular neuroprotection using magnetic nanoparticles – Biocompatibility and intracellular transport of magnetic nanoparticles in vitro", Seoul National University of Hospital (SNUH), SOUTH KOREA, **Co-PI**, (July 2008 ~ June 2009), **USD $ 10,000.0**

- "Spin transfer switched 1 Gbit magnetoresistive random access memory (MRAM) based on perpendicularly magnetized magnetic tunnel junctions (MTJs)", A-STAR, PSF funding, SINGAPORE, **PI**, (Jan. 2006 ~ May 2009), **USD $ 656,667.2**

- "Development of TMR based biosensors using DNA coated Co-ferrite magnetic particles", LG Micron Co. Ltd., SOUTH KOREA, **PI**, (Sep. 2005 ~ Mar. 2009), **USD $ 340,021.8**

- "Physical study of electromigration-induced failure mechanism of nano-structured current perpendicular to the plane (CPP) giant magnetoresistance spin-vale read sensors", FRC, SINGAPORE, **PI**, (Apr. 2005 ~ Mar. 2009) **USD $ 131,281.0**

- "Effects of half-metallic insertion layer on GMR ratio enhancement and area resistance change in nanostructured CCP-CPP GMR spin-valves", INSIC, Funding, USA, **PI**, (Sep. 2005 ~ May. 2006), **USD $ 11,000.0**

RESEARCH CONSULTATION WORKS

- **Daion Co. Ltd., KOREA,** "To develop new functional magnetic nanoparticles and coating techniques for hyperthermia, drug targeting, and MRI contrast agent applications in medicine" (Mar. 2009 ~ Dec. 2010)

- **Nuri Vista Co. Ltd., KOREA,** "Nanomedicine and Regenerative medicine modalities for brain cancer treatment", (Jan. 2011 ~ Jan. 2012)

PUBLICATIONS

BOOKS

- **Seongtae Bae**, and Jack H. Judy, "Spin-Valves in Spintronics Applications", ISBN 978-3-639-23479-4, ***VDM Publishing Co., Germany***, (2010)

BOOK CHAPTERS

- **Seongtae Bae**, "In-vitro magnetoresistive biosensors for single molecular based disease diagnostics: Optimization of sensor geometry and structure", ISBN 978-953-7619-58-9, ***Book Chapter in "Intelligent and Biosensors", IN-TECH Publisher Co., Austria,***. (2009)

- **Seongtae Bae** and Naganivetha Thiyagarajah, "Developments in Giant Magnetoresistance and Tunneling Magnetoresistance based Spintronic Devices with Perpendicular Anisotropy", ISBN 978-1-61209-302-4, ***Book Chapter in "Magnetic Thin Films: Properties, Performance and Applications", Nova Science Publisher Inc., New York, USA*** (2011)

- **Seongtae Bae** and Naganivetha Thiyagarajah, "Developments in Giant Magnetoresistance and Tunneling Magnetoresistance based Spintronic Devices with Perpendicular Anisotropy", ISBN 978-1-62257-794, ***Book Chapter in "Physical Research Technology"*** , ***Nova Science Publisher Inc., New York, USA*** (2013)

PEER REVIEWED JOURNAL PUBLICATIONS

I. "Magnetic Nanofluid Hyperthermia", "Nanomagnetic Biomaterials/Ferrite Nanofluids", "Nanomedicine", and "Magnetic Biosensors/Bioinstrumentation for Bioelectronics" Research Fields

[J01] Jung-tak Jang, Jiyun Seon, Eric Ju, Yasushi Takemura, and **Seongtae Bae**, "Magnetic Softness Tuned Iron Oxide ($Ni_{0.6}Zn_{0.4}Fe_2O_4$) Superparamagnetic Nanoparticles for Highly Efficient "Nanotheranosis" Applications", ***Adv. Fuc., Mater.***, will be submitted (2018)
CONTRIBUTION: Corresponding Author

[J02] Jung-tak Jang, Jooyoung Lee, Jiyun Seon, Eric Ju, Minjeong Jeon, Young Ill Kim, Min Gyu Kim, Yasushi Takemura, All Syed Arbab, Geon Wook Kang, Ki Ho Park, Sun Ha Paek, and **Seongtae Bae**, "Giant Magnetic Heat Induction of Magnesium Doped γ-Fe_2O_3 Superparamagnetic Nanoparticles for Completely Killing Tumors", ***Adv. Mater.***, 30, 1704362, (2018)
CONTRIBUTION: Corresponding Author

[J03] Jung-tak Jang and **Seongtae Bae**, "Mg shallow doping effects on the ac magnetic self-heating characteristics of γ-Fe_2O_3 Superparamagnetic Nanoparticles for highly efficient hyperthermia", ***Appl. Phys. Letts.***, 111, 183707, (2017)
CONTRIBUTION: Corresponding Author

[J04] Jung-tak Jang, J. W. Cheoung , J. H. Park, W. J. Lee, Y. J. Kim, J. Seon, M. Kim, J. Lee, S. H. Paek, K. H. Park and **Seongtae Bae,** "Effects of recovery time during magnetic nanofluid hyperthermia on the induction behavior and efficiency of heat shock proteins 72", ***Nature-Scientific Report***, 7, 13942 (2017)
CONTRIBUTION: Corresponding Author

[J05] **Seongtae Bae**, J. W. Cheoung , M. Jeun, J.-T. Jang, J. H. Park, Y. J. Kim, K. Lee, M. Kim, J. Lee, H. M. Hwang, S. H. Paek, and K. H. Park**,** "Magnetically softened iron oxide (MSIO) nanofluid and its application to thermally-induced heat shock proteins for ocular protection", ***Biomaterials***, 101, 165, (2016)
CONTRIBUTION: Corresponding Author and First Author

[J06] K. Kim, H. W. Park, H-E Moon, J. W. Kim, **Seongtae Bae**, J. W. Chang, W. Oh, Y. S. Yang, and Sun Ha Paek, "The effect of human umbilical cord blood-derived mesenchymal stem cells in a collagenase induced intracerebral hemorrhage rat model", ***Exp. Neurobiol.*** 24 (2), 146, (2015)
CONTRIBUTION: Contribute Author

[J07] H. Y. Jo, Y. Kim, H. W. Park, H. E. Moon, **Seongtae Bae**, J. W. Kim, D. G. Kim, and Sun Ha Paek, "The unreliability of MTT assay in the cytotoxic test of primary cultured glioblastoma cells", ***Exp. Neurobiol.*** 24 (3), 146, (2015)
CONTRIBUTION: Contribute Author

[J08] J. W. Cheoung, M. Jeun , J. H. Park, Y. J. Kim, K. H. Park, and **Seongtae Bae**, "Induction of heat shock protein-72 by magnetic nanofluid hyperthermia in cultured retinal ganglion cells for ocular neuroprotective treatment in glaucoma", ***J. of Nanomaterials***, 2015, 142387, (2015)
CONTRIBUTION: Corresponding Author

[J09] M. Jeun, S. Lee, Y. J. Kim, K. H. Park, S. H. Paek, and **Seongtae Bae**, "Physical contribution of Néel and Brown relaxation loss power to interpreting intracellular hyperthermia characteristics using superparamagnetic nanofluids", ***J. Nanoscience and Nanotechnology***, 13(8), 5719, (2013)
CONTRIBUTION: Corresponding Author

[J10] M. Jeun, S. Lee, Y. J. Kim, H-Y Jo, K. H. Park, S. H. Paek, Y. Takemura, and **Seongtae Bae**, "Physical Parameters to Enhance AC Heating Power of Ferrite Nanoparticles for Local Hyperthermia**",** ***IEEE Trans. on Nano.***, 12(7), 314, (2013),
CONTRIBUTION: Corresponding Author

[J11] M. Jeun, S. Lee, J. K. Kang, A. Tomitaka, K. W. Kang, Y. I. Kim, Y. Takemura, K.-W. Chung, J. Kwak, and **Seongtae Bae**, "Physical limits of pure superparamagnetic Fe_3O_4 nanoparticles for a local hyperthermia agent in nanomedicine",***Appl. Phys. Lett.***, 100, 092406, (2012)
CONTRIBUTION: Corresponding Author

[J12] A. Tomitaka, Minghong Jeun, **Seongtae Bae**, and Y. Takemura, "Evaluation of Magnetic and Thermal Properties of Ferrite Nanoparticles for Biomedical Applications", ***J. of Magnetics***, no. 16(2), 164 (2011), **CONTRIBUTION: Contribute Author**

[J13] M. Jeun, J. W. Cheoung, S. J. Moon, Y. J. Kim, H. Y. Shin, S. H. Lee, S. H. Paek, K. H. Park, K.-W. Chung, and **Seongtae Bae**, "Engineered superparamagnetic $Mn_{0.5}Zn_{0.5}Fe_2O_4$ nanoparticles as a localized heat shock proteins agent for ocular neuroprotection in glaucoma", ***Biomaterials***, 32, 387, (2011), **CONTRIBUTION: Corresponding Author**

[J14] Ping Zhang, Naganivetha Thiyagarajah, and **Seongtae Bae**, "Magnetically-labeled GMR biosensor with a single immobilized ferrimagnetic particle agent for the detection of extremely low concentration of biomolecules", ***IEEE Sensors Journal***, 11, 1927, (2011)
CONTRIBUTION: Corresponding Author

[J15] M. Jeun, S. J. Moon, H. Kobayashi, H. Y. Shin, A. Tomitaka, Y. Takemura, S. H. Paek, K. H. Park, K.-W. Chung, and **Seongtae Bae**, "Effects of Mn concentration on the AC magnetically-induced heating characteristics of superparamagnetic $Mn_xZn_{1-x}Fe_2O_4$ nanoparticles for hyperthermia", ***Appl. Phys. Lett.***, 96, 202511, (2010), **CONTRIBUTION: Corresponding Author**

[J16] Shao Qiang Tang, Seung Je Moon, Ki Ho Park, Sun Ha Paek, Kyung-Won Chung, and **Seongtae Bae**, "Feasibility of TEOS coated $CoFe_2O_4$ nanoparticles to a GMR biosensor agent for single molecular detection", ***J. Nanoscience and Nanotechnology***, 11, 82 (2010)
CONTRIBUTION: Corresponding Author

[J17] Hiroki Kobayashi, Atsuo Hirukawa, Asahi Tomitaka, Tsutomu Yamada, Minhong Jeun, **Seongtae Bae**, and Yasushi Takemura, "Self-heating properties under ac magnetic field and their evaluation by ac/dc hysteresis loops of $NiFe_2O_4$ nanoparticles", ***J. Appl. Phys.,*** 107, 09B322 (2010)
CONTRIBUTION: Contribute Author

[J18] Asahi Tomitaka, Hiroki Kobayashi, Tsutomu Yamada, Minhong Jeun, **Seongtae Bae**, and Yasushi Takemura "Magnetization and self-heating temperature of $NiFe_2O_4$ nanoparticles measured by applying ac magnetic field" ***J. Phys.*** 200, 122010 (2010)
CONTRIBUTION: Contribute Author

[J19] Minhong Jeun, **Seongtae Bae**, Asahi Tomitaka, Yasushi Takemura, Ki Ho Park, Sun Ha Paek, and Kyung-Won Chung, "Effects of particle dipole interaction on the AC magnetically-induced heating characteristics of ferrite nanoparticles for hyperthermia" ***Appl. Phys. Lett.***, vol. 95, 082501, (2009)
CONTRIBUTION: Corresponding Author

[J20] **Seongtae Bae**, Sang Won Lee, Atsuo Hirukawa, Yasushi Takemura, Youn Haeng Jo, and Sang Guen Lee "AC Magnetic Field-Induced Heating and Physical Properties of Ferrite Nanoparticles for a Hyperthermia Agent in Medicine", ***IEEE Trans. on Nano.,*** vol. 8, 86, (2009)
CONTRIBUTION: First & Corresponding Author

[J21] Sunwook Kim and **Seongtae Bae**, "Prediction of the optimized sensor geometry for an in-vitro tunneling magnetoresistance biosensor using an immobilized ferrimagnetic nanoparticle agent, ***J. Appl. Phys.***, vol. 104, 113911, (2008)
CONTRIBUTION: Corresponding Author

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[C36] "Effects of perpendicular interlayer coupling field on the giant magnetoresistance behavior in perpendicularly magnetized Co/Pd based pseudo spin-valves", Thiyagarajah, Naganivetha, Kim, Sunwook, **Seongtae Bae**, ***52nd MMM Conference***, Tampa, Florida, USA (2007. 11. 05 ~ 09)

[C37] "Improvements of sensing performance by specially designed magnetic shield layer in an in-vitro TMR based bio-sensor using immobilized ferrimagnetic bead agents", Sunwook Kim, **Seongtae Bae**, Jang Kwon Lim, and Tae-Min Kim, ***52nd MMM Conference***, Tampa, Florida, USA (2007. 11. 05 ~ 09)

[C38] "Low Coersivity of Free layer in [Co/Pd] Perpendicular Spin-valves", H. W. Joo, J. Heo, S. W. Kim, **Seongtae Bae**, K. A. Lee, S. S. Lee, and D. G. Hwang, ***52nd MMM Conference***, Tampa, Florida, USA (2007. 11. 05 ~ 09)

[C39] "Double Hysteresis due to Canted Spins by Co Mixed Crystal Phases in Exchange Biased [Pd/Co]5/FeMn Thin Films with Perpendicular Anisotropy", Sunwook KIM, **Seongtae BAE**, Ho-wan JOO, and Do Guwn Hwang, ***8th Perpendicular Magnetic Recording Conference (PMRC)***, Tokyo, Japan (2007. 10. 15 ~ 17)

[C40] "Annealing effect of the stack number N in [Pd/ferromagnet]$_N$/FeMn films with out-of- plane magnetization"Ho-wan JOO, Jang HEO, Sunwook KIM, **Seongtae BAE**, Ky-am LEE, Sang-suk LEE and Do-guwn HWANG, ***8th Perpendicular Magnetic Recording Conference (PMRC)***,Tokyo, Japan (2007. 10. 15 ~ 17)

[C41] "Coating of cobalt ferrite nanoparticles with silica for an in-vitro GMR biosensor agent", Shao Qiang Tang, **Seongtae Bae**, Sang Won Lee, and Wonchoon Lee, ***Intermag Conference***, Madrid, Spain, (2008. 05. 04 ~ 08)

[C42] "Magnetic degradation of GMR spin-valve multi-layers due to electromigration induced failures", Jing Jiang, **Seongtae Bae** and Hojun Ryu, ***Intermag Conference***, Madrid, Spain, (2008. 05. 04 ~ 08)

[C43] [**INVITED**] "Applications of quarterly superparamagentic ferrite nanoparticles for an in-vivo hyperthermia agent in medicine", **Seongtae Bae**, ***International Drug Discovery Science and Technology (IDDST)***, Beijing, CHINA, (Oct., 2008)

[C44] "Effects of Ar gas pressure during sputtering of $Co_{80}Fe_{20}$ insertion on the exchange bias characteristics in [Pd/Co]$_5$/$Co_{80}Fe_{20}$/FeMn thin films with perpendicular anisotropy", Sunwook Kim, **Seongtae Bae**, Lin Lin, Jang Heo, Ho Wan Joo, and Ky Am Lee, ***53rd MMM Conference***, Austin, Texas, USA (2008. 11. 10 ~ 14)

[C45] "AC magnetically induced heating of solid state superparamagnetic ferrite nanoparticles and its physical characteristics for hyperthermia", Sang Won Lee, **Seongtae Bae**, Min Hong Jeun, Koshi Tomohiro, and Takemura Yasushi, ***53rd MMM Conference***, Austin, Texas, USA (2008. 11. 10 ~ 14)

[C46] "Effects of NiFe and Co insertion on the perpendicular anisotropy, soft layer coercivity and GMR in perpendicularly magnetized [Pd/Co]/Cu/[Co/Pd] pseudo spin-valves", Naganivetha Thiyagarajah, Seongtae Bae, Ho Wan Joo, and Do Guwn Hwang, ***53rd MMM Conference***, Austin, Texas, USA (2008. 11. 10 ~ 14)

[C47] "Significant enhancement of electromigration-induced failure lifetime due to an ultra-thin Co insertion at the NiFe/Cu interface in GMR spin-valve read sensors", Jing Jiang, **Seongtae Bae**, and Ho Jun Ryu, ***53rd MMM Conference***, Austin, Texas, USA (2008. 11. 10 ~ 14)

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[C49] "Numerical analysis of in-vitro GMR/TMR biosensors with immobilized ferrimagnetic sensor agents for single molecular detection", Ping Zhang, and **Seongtae Bae**, ***Intermag Conference***, Sacramento, California, USA (2009. 05. 04 ~ 08)

[C50] "Correlation between the degradation of perpendicular anisotropy and the double hysteresis behavior in [Pd/Co]$_n$/FeMn exchange biased thin films.", Ho Wan Joo, **Seongtae Bae**, Sunwook Kim, Lin Lin, and Do Guwn Hwang, ***Intermag Conference***, Sacramento, California, USA (2009. 05. 04 ~ 08)

[C51] “Interlayer coupling through Cu spacer in the [Pd/Co]/Pd/Co/Cu(t)/Co/[Pd/Co]/FeMn exchange biased spin-valves with perpendicular anisotropy”, J. Heo, Ho Wan Joo, Naganivetha Thiyagarajah, K. Lee, and **Seongtae Bae**, ***Intermag Conference***, Sacramento, California, USA (2009. 05. 04 ~ 08)

[C52] “Self-heating properties under ac magnetic field and their evaluation by ac/dc hysteresis loops of $NiFe_2O_4$ nanoparticles”, Hiroki Kobayashi, Atsuo Hirukawa, Asahi Tomitaka, Tsutomu Yamada, Minhong Jeun, **Seongtae Bae** and Yasushi Takemura, ***International Conference on Magnetism (ICM)***, Karlsruhe, Germany (2009. 07. 26 ~ 31)

[C53] “A physical model of exchange bias in the $[Pd/Co]_5$/FeMn thin films with perpendicular anisotropy”, Lin Lin, **Seongtae Bae**, Howan Joo, et. al.,, ***11th Joint MMM-Intermag Conference***, Washington. D. C., USA (2010.01.18 ~ 22)

[C54] “High magnetic and thermal stability of nano-patterned [Co/Pd] based pseudo spin-valves perpendicular anisotropy for 1Gb MRAM applications”, Naganivetha Thiyagarajah, **Seongtae Bae**, and Howan Joo, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C55] “AC magnetically-induced heating characteristics and biocompatibility of $Mn_xZn_{1-x}Fe_2O_4$ superparamagnetic nanoparticles for hyperthermia applications”, Minhong Jeun, Seungje Moon, Sawlani Haresh Kalyan, Hiroki Kobayashi, Asahi Tomitaka, Yasushi Takemura, Yu Jeong Kim, Ki Ho Park, Sun Ha Paek, Kyung-Won Chung, and **Seongtae Bae**, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C56] “Villari reversal” in the Exchange biased $[Pd/Co]_5$/FeMn Multilayered Thin Films with Perpendicular Anisotropy”, Minhong Jeun, Lin lin, Ho Wan Joo, **Seongtae Bae**, Jang Heo, and Ky Am Lee, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C57] “Magnetic properties, biocompatibility, and AC magnetically-induced heating characteristics of superparamagnetic $Ni_xZn_{1-x}Fe_2O_4$ nanoparticles for bioapplications”, Seung Je Moon, Yan Ru Tan, Minhong Jeun, Koji Ueda, Asahi Tomitaka, Yu Jeong Kim, Hye Young Shin, Yasushi Takemura, Ki Ho Park, Sun Ha Paek, Kyung-Won Chung, and **Seongtae Bae**, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C58] “Thermomigration-induced magentic degradation of CPP and CCP GMR spin-valve read sensors operating at high current density", Zeng Dinggui and **Seongtae Bae**, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C59] “Self-heating properties under ac magnetic field and their evaluation by ac/dc hysteresis loops of $NiFe_2O_4$ nanoparticles”, Hiroki Kobayashi, Atsuo Hirukawa, Asahi Tomitaka, Tsutomu Yamada, Minhong Jeun, **Seongtae Bae** and Yasushi Takemura, ***11th Joint MMM-Intermag Conference***, Washington, D.C., USA (2010, 1, 18 ~ 22)

[C60] "Effects of Perpendicular Anisotropy on the Interlayer Coupling in Perpendicularly Magnetized [Pd/Co]/Cu/[Co/Pd] Spin-Valves" Naganivetha Thiyagarajah, Ho Wan Joo, Jack H. Judy, and **Seongtae Bae**, ***9th Perpendicular Magnetic Recording Conference***, Sendai, JAPAN, (2010 5, 17 ~19)

[C61] “Effects of NiFe/Co Insertion at the [Pd/Co] and Cu Interface on the Magnetic and GMR Properties in Perpendicularly Magnetized [Pd/Co]/Cu/[Co/Pd] Pseudo Spin-Valves", Naganivetha Thiyagarajah, Lin Lin, Jack H. Judy, and **Seongtae Bae**, ***9th Perpendicular Magnetic Recording Conference***, Sendai, JAPAN, (2010 5, 17 ~19)

[C62] "Thermomigration-Induced Magnetic Degradation of Current Perpendicular to the Plane GMR Spin-Valve Read Sensors Operating at High Current Density", Ding Gui Zeng, Jack H. Judy, and **Seongtae Bae**, ***9th Perpendicular Magnetic Recording Conference,*** Sendai, JAPAN, (2010 5, 17 ~19)

[C63] "Magnetic characterization and self-heating of various magnetic nanoparticles for medical applications", Ashahi Tomitaka, Hiroki Kobayashi, Tsutomu Yamada, Minhong Jeon, **Seongtae Bae**, and Yasushi Takemura, ***IEEE International Nanoelectronics Conference (INEC)***, Vol. 1 & 2, pp 896-897, Hong Kong, China, (Jan. 2010)

[C64] "Self-heating evaluation and magnetic property of different size magnetic nanoparticles", Koji Ueda, Hiroki Kobayashi, Shinsuke Hatsugai, Asahi Tomitaka, Tsutomu Yamada, Minhong Jeun, **Seongtae Bae**, and Yasushi Takemura, ***2nd ISAMMA***, Sendai, JAPAN, (July 2010)

[C65] "Physical nature of anomalous peaks observed in EHE loops of [Co/Pd] based exchange biased spin-valves with perpendicular anisotropy" Naganivetha Thiyagarajah, and Seongtae Bae, 55th MMM International Conference, Atlanta, GA, USA (2010, Nov., 14 ~ 18)

[C66] "Feasibility of Engineered Superparamagnetic $Mn_{0.5}Zn_{0.5}Fe_2O_4$ Nanoparticles to a Localized Heat Shock Protein Agent for Ocular Neuroprotection in Glaucoma" Minhong Jeun, Jin Wook Jeong, Seung Je Moon, Yu Jeong Kim, Hye Young Shin, Sang Hoon Lee, Sun Ha Paek, Kyung-Won Chung, Ki Ho Park, and Seongtae Bae 55th MMM International Conference, Atlanta, GA, USA (2010, Nov., 14 ~ 18)

[C67] "Improvement of perpendicular exchange bias in [Pd/Co]/FeMn thin films by tailoring the magnetoelastically-induced perpendicular anisotropy" Lin Lin, Naganivetha Thiyagarajah, Howan Joo, Jang Heo, Ky Am Lee, and **Seongtae Bae**, ***55th MMM International Conference***, Atlanta, GA, USA (2010, Nov., 14 ~ 18)

[C68] "Spin transfer switching characteristics in $[Pd/Co]_m/Cu/[Co/Pd]_n$ pseudo spin-valve nanopillars with perpendicular anisotropy" Thiyagarajah Naganivetha, and **Seongtae Bae,** ***56th MMM International Conference***, Scottsdale, AZ, USA (2011, Oct. 30th ~ Nov. 3rd)

[C69] "Hall effect-induced acceleration of electromigration failures in spin valve multilayers under magnetic field", Jing Jiang, Ding Gui Zeng, Kyung-Won Chung, Jongryoul Kim, and **Seongtae Bae**, ***56th MMM International Conference***, Scottsdale, AZ, USA (2011, Oct. 30th ~ Nov. 3rd)

[C70] "Physical Limits of Pure Superparamagnetic Fe_3O_4 Nanoparticles for a Local Hyperthermia Agent in Nanomedicine", Minhong Jeun; Sanghoon Lee; Hyunrim Oh; Ashahi Tomitaka; Yasushi Takemura; Kyung-Won Chung; Young Il Kim; Keon Wook Kang; Jiyeon Kwak; and **Seongtae Bae**, ***56th MMM International Conference***, Scottsdale, AZ, USA (2011, Oct. 30th ~ Nov. 3rd)

[C71] "Physical Parameters to Enhance AC Heating Characteristics of Superpara- and Ferri-Magnetic Nanoparticles for Local Hyperthermia" Minhong, Jeun; Sanghoon Lee; Hyunrim Oh; Yu Jeong, Kim; Ki Ho Park; Sun Ha Paek; Yasushi Takemura; Kyung-Won Chung; Jiyeon Kwak, and **Seongtae Bae**, ***56th MMM International Conference***, Scottsdale, AZ, USA (2011, Oct. 30th ~ Nov. 3rd)

[C72] "Effects of Media Stray Field on Electromigration Characteristics in Current-Perpemdicular-to-Plane Giant Magnetoresistance Spin-Valve Read Sensors", Ding Gui Zeng, K. Lee, K-W Chung, and **Seongtae Bae**, ***Intermag Conference***, Vancouver, Canada, (2012. 05. 07 ~ 11)

[C73] "Physical evaluation of Neel and Brown Relaxation for Interpreting Intercellular Heating Mechanism of Superparamagnetic Fluid Hyperthermia in Nanomedicine", Minhong Jeun, S. Lee, J. Kang, Y. Kim, K. Park, S. Park, S. Takemura, Y. Kim, K. Kang, K. Chung, J. Kwak, and **Seongtae Bae**, ***Intermag Conference***, Vancouver, Canada, (2012. 05. 07 ~ 11)

[C74] "Magnetically Engineered $MgFe_2O_4$ Nanoparticles Controlled by Calcining Process during sol-gel Synthesis for Intra-arterial Hyperthermia", Sanghoon Lee, Minghon. Jeun, Keon W. Kang, Young-Il. Kim, K. Chung, J. Kwak, and **Seongtae Bae**, ***Intermag Conference***, Vancouver, Canada, (2012. 05. 07 ~ 11)

[C75] "Giant Magnetoresistance Effects on Electromigration Characteristics in Spin-Valve Read Sensors During Retrieving Operation", Ding Gui Zeng, K. Lee, K. Chung, and **Seongtae Bae**, ***Intermag Conference***, Vancouver, Canada, (2012. 05. 07 ~ 11)

[C76] "Exchange bias characteristic in single dot $[Co/Pd]_5$/FeMn nano-pillars", Thiyagarajah Naganivetha, Lin Lin, and **Seongtae Bae**, ***12th Joint MMM-Intermag Conference***, Chicago, IL, USA (2013, 1, 14 ~ 18)

[C77] [**INVITED**] "Magnetically-Engineered Superparamagnetic Nano-Theranostic Agents with Exceptionally High AC Heat Induction and r_2-Relaxivity", **Seongtae Bae**, ***The 6th Asian Congress of Hyperthermia Oncology and the 31st Japanese Congress of Thermal Medicine***, Fukui, Japan, (2014, 09. 05 ~ 06)

[C78] **[INVITED]** "Magnetically-Softened IronOxide (MSIO) Nanofluid and its Applications to Theramlly-Induced Heat Shock Protein for Ocular Neuroprotection in Glaucoma", **Seongtae Bae**, ***Nanotechnology and Cancer Symposium***, Augusta, USA (2017, 03. 05)

[C79] **[INVITED] (Symposium 2: Bio-Initiative Spintronics)** "Magnetically Softened Iro Oxide (MSIO) Nanofluids and its Applications for Ocular Neuroprotection in Glaucoma", Seongtae Bae and Jung-tak Jang, ***International Conference of Asian Union of Magnetics Societies***, June 3rd ~ June 7th, Jeju, KOREA (2018)

LOCAL/REGIONAL REFERRED JOURNAL PUBLICATIONS

[LJ01] **Seongtae Bae**, K. H. Shin, K. I. Min, and J. Y. Kim, "Analysis of giant magnetoresistance behavior of NiFeCo/Cu/NiFeCo/FeMn spin valves", ***J. Kor. Magn. Soc.***, vol(no). 2, 112, (1996) (In Korean)

[LJ02] **Seongtae Bae**, and J. Y. Kim, "A study on the electromigration phenomena in dielectric passivated Al-1%Si thin film interconnection under DC and pulsed DC conditions", ***J. of Kor. Vac. Soc.***, no. 5, 229, (1996) (In Korean)

[LJ03] **Seongtae Bae**, K. H. Shin, and J. Y. Kim, "A study on the magnetic properties in NiFeCo/Cu/NiFeCo/FeMn multilayered thin films for magnetoresistive head", ***J. Kor. Vac. Soc***., no. 1, 67 (1995) (In Korean)

[LJ04] **Seongtae Bae**, K. H. Shin, K. I. Min, and J. Y. Kim, "Magnetoresistance of NiFeCo/Cu/NiFeCo/FeMn multilayered thin films with low saturation field", ***Int. Sym. Phys. Magn. Mater.***, no. 2, 385 (1995)

[LJ05] A. Tomitaka, Minghong Jeun, **Seongtae Bae**, and Y. Takemura, "Evaluation of Magnetic and Thermal Properties of Ferrite Nanoparticles for Biomedical Applications", ***J. of Magnetics***, no. 16(2), 164 (2011)

PUBLISHED REPORTS AND PUBLISHED ARTICLES IN MAGAZINE

[AM01] **Seongtae Bae**, "A nanomedicine approach for ocular neuroprotection in glaucoma", Newsletter on-line publication, ***Nanowerk Spotlight***, Oct. 25rd, USA (2010)

[AM02] **Seongtae Bae**, "Self-heating nanoparticles as tumor destroying hyperthermia agents", Newsletter on-line publication, ***Nanowerk Spotlight***, Jan. 23rd, USA (2007)

[AM03] **Seongtae Bae**, "Self-heating nanoparticles as tumor destroying hyperthermia agents", Newsletter Tokyo (on-line), ***Nanoscience and Nanotechnology World***, Feb., JAPAN (2007)

[AM04] **Seongtae Bae**, and S. W. Lee, "Development of an in-vivo hyperthermia system using self-heated magnetic nanoparticles", ***Nanoweekly***, no. 223, 9, Feb., KOREA (2007) (In Korean)

[AM05] **Seongtae Bae**, "Semiconductor fabrication process and MOS circuit design", ***Electronic Science (Periodical Science Magazine)***, KOREA (for 2 years, 1990 ~ 1992) (In Korean)

INVITED PRESENTATION, SEMINAR TALKS AND PUBLIC LECTURES

[P01] **Seongtae Bae**, "The challenge for high density magnetoresistive random access memory (MRAM) using a new integrating Circuit method", ***Korea Institute of Science and Technology (KIST)***, KOREA, (Sep. 2000)

[P02] **Seongtae Bae**, "Enhancement of bottom GMR spin-valves with anti-ferromagnetic oxide pinned layers", ***Seagate Technology***, USA. (Feb. 2001)

[P03] **Seongtae Bae**, "Electromigration-induced failures in single layered NiFe thin films for GMR heads",***Seagate Technology***, USA, (Feb. 2001)

[P04] **Seongtae Bae**, "A study on electromigration of NiFe, CoFe, and NiFe/CoFe magnetic thin films", ***Seagate Technology***, USA, (Aug. 2001)

[P05] **Seongtae Bae**, "Effects of Ar gas cluster ion beam processing on crystalline orientation texture, surface roughness, magnetic, and GMR properties of bottom oxide GMR spin-valves", ***Seagate Technology,*** USA, (Aug. 2001)

[P06] **Seongtae Bae**, "Applications of GMR spin-valves for magneto-electronic devices", ***Korea Institute of Science and Technology (KIST)***, KOREA, (Dec. 2001)

[P07] **Seongtae Bae**, "Electrical and magnetic properties of GMR spin-valve "Transpinnors" and their magneto-electronic applications", ***Samsung Electronics Co. (Samsung Advanced Institute of Technology)***, KOREA, (Dec. 2002)

[P08] **Seongtae Bae**, "Low junction resistance tunneling magnetresistace read heads and its electrical reliability", ***Kookmin University***, KOREA (Jan. 2004)

[P09] **Seongtae Bae**, "Electrical reliability of tunneling magnetoresistive read sensor", ***Korea University***, KOREA, (Feb. 2004)

[P10] **Seongtae Bae**, "Low junction resistance tunneling magnetresistace read heads and its electrical reliability", ***Kwangwoon University***, KOREA, (Feb. 2004)

[P11] **Seongtae Bae**, "Spintronic materials and device applications". ***Kookmin University, (Invited lecturer for workshop)***, KOREA, (Feb. 2004)

[P12] **Seongtae Bae**, "Dielectric breakdown mechanism in TMR read sensors", ***Korea Institute of Science and Technology (KIST)***, KOREA, (Feb., 2004)

[P13] **Seongtae Bae**, "Development of all-metal magnetoresistive random access memory (MRAM) using closed-flux pseudo spin-valves", ***National University of Singapore***, SINGAPORE (April 2004)

[P14] **Seongtae Bae**, "Development of remote-Sensing IN-VIVO and implantable intraocular pressure biosensors using magnetostriction/GMR (TMR) based nanoactuators", ***LG Micron Co.***, KOREA, (July, 2004)

[P15] **Seongtae Bae**, "Technical applications of modern magnetism", ***Kookmin University (Invited lecturer for workshop)***, KOREA, (Jan. 2005)

]P16] **Seongtae Bae**, "Nano magnetic sensors and magnetic nanoparticles for biomedical applications", ***LG Micron Co.***, KOREA, (Feb. 2005)

[P17] **Seongtae Bae**, "Effects of half-metallic insertion layer on GMR ratio enhancement and change of area resistance in CCP-CPP GMR spin-valve heads", ***INSIC-EHDR***, USA, (Mar. 2005)

[P18] **Seongtae Bae**, "Nano-structured magnetic sensors and magnetic materials for biomedical Applications", ***Yonsei University,*** KOREA, (Mar. 2005)

[P19] **Seongtae Bae**, "Anomalous change of magneto-resistance with half-metal conductivity", ***INSIC-EHDR***, USA, (Nov. 2005)

[P20] **Seongtae Bae**, "Hyperthermia applications of nano-size controlled superparamagnetic $NiFe_2O_4$ particcles", ***Tokyo Institute of Technology***, JAPAN, (Dec. 2005)

[P21] **Seongtae Bae**, "Applications of nanomagnetism for biosensors and biomedicine", ***Korea Basic Science Institute***, KOREA, (Dec. 2005)

[P22] **Seongtae Bae**, "Why we need the "magnetoelectronic or (metallic spintronic)" devices?", ***Electronic Telecommunication Research Institute (ETRI)***, KOREA, (May, 2006)

[P23] **Seongtae Bae**, "The perspectives of biomagnetics", ***Sangji University***, KOREA, (July, 2006)

[P24] **Seongtae Bae**, "Applications of nano-size controlled ferrite particles for a hyperthermia agent in biomedicine", ***Korea Institute of Science and Technology (KIST)***, KOREA, (Oct. 2006)

[P25] **Seongtae Bae**, "Developmnts of ultra low field detection spin-valve devices with extremely high sensitivity and wide operating frequencies for various electronic applications", ***Electronic Telecommunication Research Institute (ETRI)***, KOREA, (Feb. 2007)

[P26] **Seongtae Bae**, "Hyperthermia using Ni-ferrite nanoparticles", ***Kookmin University***, KOREA, (July, 2007)

[P27] **Seongtae Bae**, "Biomagnetics in electronic devices", ***Kwangwoon University***, KOREA, (Mar. 2008)

[P28] **Seongtae Bae**, "Magnetism and magnetic devices in medicine and medical instrumentations", ***Samsung Advanced Institute of Technology (SAIT)***, KOREA, (Mar. 2008)

[P29] **Seongtae Bae**, "TMR/GMR applications for unattended battle field senor and in-vitro biosensor applications", ***LG Innotech. Co. Ltd.***, KOREA, (May 2008)

[P30] **Seongtae Bae**, "Magnetic nanoparticles in biomedicine", ***Daion Co. Ltd.***, KOREA, (July 2008)

[P31] **Seongtae Bae**, "Future of magnetic devices in medicine", ***Korea Institute of Science and Technology (KIST)***, KOREA, (July 2008)

[P32] **Seongtae Bae**, "Applications of quarterly superparamagentic ferrite nanoparticles for an in-vivo hyperthermia agent in medicine", ***International Drug Discovery Science and Technology (IDDST)***, Beijing, CHINA, (Oct., 2008)

[P33] **Seongtae Bae**, "Development of an in-vitro GMR biosensor platform for the quantitative diagnostics of myocardial impaction in biomedicine", ***Bio-Focus Co. Ltd.***, KOREA, (Jan. 2009)

[P34] **Seongtae Bae**, "New Diagnosis and Treatment Modalities for brain tumors & neural disease using superparamagentic nanoparticles and AC magnetic systems", ***Ministry of Knowledge and Economics Department***, KOREA, (Jan. 2010)

[P35] **Seongtae Bae**, "Nanomedicine based on Biomagentics and Biomagnetic Materials", ***Dae Gu National Nanocore Center***, Dae Gu, KOREA (Apr. 2010)

[P36] **Seongtae Bae**, "Nanomagnetism and Magnetoelectronics in Nanomedicine", ***Nuri Telecommunication Co. Ltd., R&D Center***, Seoul, KOREA (Sep. 24th, 2010)

[P37] **Seongtae Bae**, "A Nanomedicine Approach based on Local Magnetic Hyperthermia to Ocular Neuroprotection in Glaucoma" , ***Iowa State University***, Ames, IA, USA, (Mar. 23rd, 2011)

[P38] **Seongtae Bae**, "Superpara-/Ferri-magnetic Nanoparticles and Advanced Biomagnetics for Nanomedicine Applications", ***Seoul National University Hospital, Cancer Research Center***, Seoul, KOREA, (June 17th, 2011)

[P39] **Seongtae Bae**, "Artificially-Engineered Superparamagnetic Ferrite Nanoparticles/Nanofluids and Advnaced Electromagnetic Technology in "Nanomedicine"", ***Seoul National University Hospital, Cancer Research Center***, Seoul, KOREA, (April 3rd, 2014)

[P40] **Seongtae Bae**, "Convergence Medicine Approaches Based on SpinBiotronics", ***Ewha Woman's University, Convergence Medicine Research Insttute, Seoul, KOREA***, (June 11th, 2014)

[P41] **Seongtae Bae**, "Magnetically-Engineered Superparamagnetic Nano-Theranostic Agents for Highly Efficient Magnetic Nanofluid Hyperthermia in Medicine", ***Ulsan National Institute of Science and Technology (UNIST),*** Ulsan, KOREA, (Sep. 22nd, 2014)

[P42] **Seongtae Bae**, "Nanostructure Magentoelectronics Materials and Devices in Engineering Medicine", ***University of South Carolina, Columbia***, USA, (Feb. 5th, 2015)

[P43] **Seongtae Bae**, "Magnetic Nanofluid Hyperthermia with Magnetically-Engineered Nanoparticles and Its Application to Nanomedicine", ***USC-Colon Cancer Research Center***, USA, (Mar. 25th, 2016)

[P44] **Seongtae Bae**, "Magnetic Nanofluid Hyperthermia with Magnetically-Engineered Nanoparticles and Its Application to Nanomedicine", ***Cancer Research Center, Georgia Regent University***, Augusta, USA, (Apr. 19th, 2016)

[P45] **Seongtae Bae**, "Magnetically Softened Iron Oxide (MSIO) Nanofluid and its Application for Magnetic Hyperthermia", ***Nanotechnology and Cancer Symposium***, Augusta (GA), USA, (March 26th, 2017)

[P46] **Seongtae Bae**, "Nanomagnetics in Biomedicine", ***Ehwa Women's University***, Seoul, Korea (June 9th, 2017)

[p47] **Seongtae Bae**, "Nanomagnetic "Theranosis" in Nanomedicine", ***Korea Institute of Industrial Technology*** (KITECH), Seoul Korea, (Dec. 27th, 2017)

[P48] ***Seongtae Bae***, "Thermal Ablation of Solid Type Cancers with Colossal Magnetic Heat Induction and its Clinical Trials", ***Department of Radiation Oncology, Medical School, University of Augusta***, USA, (Mar. 28th, 2018)

STUDENTS AND STUDENT COMMITTEE

POSTDOCTPRAL RESEARCH FELLOWS, RESEARCH STAFFS AND VISITING SCHOLAR

- **Dr. Choi, Yeon Bong**
  Postdoctoral Research Fellow (Aug. 2005 ~ July 2006)
  Research area: Fabrication of nanostructured tunneling magnetoresistance device for an in-vitro biosensor application
  Current Position & Address: Principal Engineer, Samsung Semiconductor Co. Ltd., KOREA

- **Dr. Lee, Sang Won**
  Postdoctoral Research Fellow (Aug. 2005 ~ July 2008)
  Research area: Synthesis of magnetic nanoparticles for hyperthermia and immunoassay based GMR biosensor agent applications
  Current Position & Address: Deputy Research Director, LG Innotech Co. Ltd., KOREA

- **Dr. Kim, Sun Wook**
  Postdoctoral Research Fellow (Apr. 2006 ~ Jan. 2009)
  Research area: TMR spin-valves for in-vitro biosensor applications and Spin transfer torque MRAM
  Current Position & Address: Research Assistant Professor, Department of Physics, Sang Ji University, KOREA

- **Dr. Guo, Jie**
  Postdoctoral Research Fellow (Apr. 2006 ~ Jan. 2009)
  Research area: Theoretical simulation of spin torque switching characteristics for nano-structured MRAM with Perpendicular anisotropy
  Current Position & Address: Research Fellow, Information Storage Materials Laboratory, NUS, SINGAPORE

- **Mr. Tang, Shaoqiang**
  Research Engineer (Aug. 2006 ~ Jan. 2009)
  Research area: Immunoassay biosensors for the detection of ultra low concentration of biomolecules
  Current Position & Address: Research Staff, Bayer Inc. Singapore

- **Dr. Joo, Ho Wan**
  Postdoctoral Research Fellow (Jan. 2009 ~ July 2010)
  Research Area: Nanostructured magnetic/non-magnetic thin film hybrid power generators based on photovoltaic and yhermoelectric effects for a renewable energy system
  Current Position & Address: Research Assistant Professor, Department of Physics, Dankook University, KOREA

- **Dr. Jang, Jung-Tak**
  Postdoctoral Research Fellow (Jan. 2016 ~ Present)
  Research area: Synthesis of Ferrite Magnetic Nanoparticles and Their Applications to Nanomedicine

- **Dr. Lee, Kwan**
  Visiting Scholar (June. 2016 ~ Jan. 2017)
  Research area: Synthesis and Physics of Metallic Based Nanoparticles and Their Applications to Spintronis and Biomedicine

- **Ms. Lee, Sol**
  Research Engineer (Feb. 2009 ~ May 2009)
  Research Area: In-vitro GMR biosensors for Myocardial infarction
  Current Position & Address: N/A

- **Mr. Moon Seung Je**
  Research Engineer (Jan. 2009 ~ Jan. 2011)
  Research Area: Magnetic nanoparticles for MRI-guided Hyperthermia in Nanomedicine
  Current Position & Address: Research Staff, Global Foundaries Co. Ltd., Singapore

- **Dr. Jiang Jing, Graduated with Ph. D** (Nov. 2011)
  Thesis Title: Electromigration-induced failure characteristics of nanostructured GMR spin-valves and magnetic multilayers for the electrical reliability of spintronic devices
  Current Position & Address: Senior technology analyst, NanoGlove Pte. Ltd., Singapore

- **Dr. Naganivetha Thiyagarajah, Graduated with Ph. D** (Nov. 2011)
  Thesis Title: Spin transfer switched spintronic devices using [Co/Pd] based pseudo spin-valves with perpendicular anisotropy
  Current Position & Address: Postdoctoral Research Fellow, Department of Physics, Magnetism and Spin Electronics Laboratory, Tribity College Dublin, Iceland

- **Dr. Zeng Dinggui, Graduated with Ph. D (**Aug. 2012**)**
  Thesis Title: High current density induced magnetic failures in nanostructured current perpendicular-to-plane giant magentoresistance spin-valve devices
  Current Position & Address: Research Staff Engineer, Seagate Technology, Singapore

- **Dr. Lin Lin, Graduated with Ph. D (**Sep. 2012**)**
  Thesis Title: Exchange bias characteristics in [Pd/Co]/FeMn bi-layered thin films with perpendicular anisotropy and the applications for spin-valves in spintronics
  Current Position & Address: Research Staff, Global Foundaries Co. Ltd., Singapore

- **Mr. Hiroshi Nakano, Exchange M.S. Student from Tokyo Institute of Technology, Japan** (Aug. 2010 ~ May, 2011)
  Thesis Title: Observation of intrinsic and extrinsic superparamagentic blocking temperature in nanoparticles
  Current Position & Address: Graduate student, Department of Physical Electronics, Tokyo Institute of Technology, JAPAN

- **Ms. Oh, Hyun Rim, Research Engineer** (Apr. 2011 ~ Oct. 2011)
  Thesis Title: Glioblastma Therapeutics using Nanomedicine approaches
  Current Position & Address: Ph.D Student, Department of Medicine, NUS, Singapore

- **Ms. Kang, Jae Kyeong, Research Engineer (**July 2011 ~ Mar. 2012)
  Thesis Title: A study on systemic circulation of nanoparticles with different sizes using MRI and PET imaging
  Current Position & Address: Research Scientist, Korea NIH, Korea

- **Dr. Jeun, Minhong, Graduated with Ph. D** (July. 2013)

Thesis Title: Local induction of heat shock proteins using magnetic fluid hyperthermia for ocular neuroprotection in glaucoma
Current Position & Address: Postdoctoral Research Fellow, Korea Institute of Science and Technology (KIST), KOREA

- **Mr. Lee, Sanghoon, Graduated with M.E.** (July 2013)
  Thesis Title: Ferrimagnetic $MgFe_2O_4$ nanoparticles for intra-arterial hyperthermia agent applications
  Current Position & Address: Ph. D program, Department of Electrical and Computer Engineering, National University of Singapore, Singapore

- **Ms. Zhang Ping, Graduated with M.S** (July 2014)
  Thesis Title: Development of a multi-channel point-of-care biosensor platform for disease diagnosis using giant magentoresistance biochips

CURRENTLY ADVISING Postdoctors/Ph. D/M. E (M.S.) STUDENTS AND RESEARCH STAFFS

- **Dr. Jung-tak Jang, Postdoctoral Research Fellow** (Jan. 2016 ~ Present)
- **Mr. Jiyun Seon, Ph.D student** (Aug. 2016 ~ Present)
- **Mr. Eric (Sanghoon) Ju, Undergraduate Researcher** (Aug. 2017 ~ Present)
- **Dr. Minkyu Kim, Postdoctoral Research Fellow** (June 1st, 2018 ~ Present)
- **Dr. Hyungsub Kim, Postdoctoral Research Fellow** (June 1st, 2018 ~ Present)
- **Dr. Wonbae Ko, Postdoctoral Research Fellow** (June 1st, 2018 ~ Present)
- **Dr. Ji-Wook Kim, Postdoctoral Research Fellow** (June 1st, 2018 ~ Present)

ADVISED & CURRENTLY ADVISING FYP (Final Year Project, Undergrasuate) STUDENTS

Student Name	Starting/End Date	Thesis Title	Advised Status (Sole or Co-Advised)
SAWLANI HARESH KALYAN	2008/2009	Magnetic characteristics and synthesis of $MnZnFe_2O_4$ ferrite nanoparticles for biomedical applications	Sole
TAN YAN RU	2008/2009	Magnetic characteristics and synthesis of $NiZnFe_2O_4$ ferrite nanoparticles for biomedical applications	Sole
LIU YICHENG	2008/2009	Coating of superparamagnetic nanoparticles for bio-applications	Sole
TAN CHEE HAU ALVIN	2011/2012	Synthesis and investigation of magnetic/heating character-istics of superparamagnetic $Mn_xX_{1-x}Fe2O4$ nanoparticles	Sole

	for bioapplications

Ph. D/M.E./M.S. THESIS COMMITTEES

- **Govindan Srrenivasan Ph. D**, (2009), Dept. of Electrical and Computer Engineering, Nanyang Technical Univerity
- **Chen, WenQian** (2009), **Ph. D**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Ren Hanbiao** (2008), **Ph. D**, Spintronics Division, Data Storage Institute in Singapore
- **Randall Law Yaozhang**, (2009), **Ph. D**, Spintronics Division, Data Storage Institute in Singapore
- **Lin Lin** (2011), **Ph. D**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Jing Jiang**, (2011), **Ph. D**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Naganivetha Thiyagarajah**, (2011), **Ph. D**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Shyamsunder Regunnathan**, (2012) Ph. D, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Lu Hui**, (2013), Ph. D, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Zhang Ping**, (In progress), **M.S. (Oral Exam)**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Zeng Dinggui**, (In progress), **Ph. D (Oral Exam)**, Dept. of Electrical and Computer Engineering, National University of Singapore
- **Minhong Jeun**, (In progress), **Ph. D (Oral Exam),** Dept. of Electrical and Computer Engineering, National University of Singapore
- **Chieh Man Chin, M.E.** (2009), Dept. of Bioscience, National University of Singapore
- **Cihan Oner Ph. D**, (2017), Dept. of Electrical Engineering, University of South Carolina, USA

FYP (Final Year Project, Undergraduate) THESIS EXAMINER

S. No.	Student Name	Department/Faculty
1	BAO LEI	ECE department/Engineering
2	CHINTAN HASMUKHRAY DAVE	ECE department/Engineering

3	KOH YENG POONG	ECE department/Engineering
4	WIWIN RENANDYA	ECE department/Engineering
5	GUO JIANHUI	ECE department/Engineering
6	CHENG MIN KE AUGUSTIN	ECE department/Engineering
7	LOW CAI YING JOYCELYN	ECE department/Engineering
8	WIRIA	ECE department/Engineering
9	XU CHINRU	ECE department/Engineering
10	ZHANG MINGQI	ECE department/Engineering
11	SHRADDHA BHUSHAN PATIL	ECE department/Engineering
12	SHIVANTHILINGGAM r	ECE department/Engineering
13	HUANG SHAOYING PATRICIA	ECE department/Engineering
14	WONG SWEE POO	ECE department/Engineering
15	NADZIRAH BTE ZAINI	ECE department/Engineering
16	NABEEL REHMAN SHAMI	ECE department/Engineering
17	TAN WEI HONG JULIAN	ECE department/Engineering
18	CHEN YIGUO	ECE department/Engineering
19	YEAP CHUN CHEE	ECE department/Engineering
20	ARSLAN ISHAQUE GONDAL	ECE department/Engineering

TEACHING HISTORY & EVALUATION

When I joined at NUS in 2004, the ECE (electrical and computer engineering) department was very keen to provide biomedical engineering related courses. Accordingly, I was very fortunate to have strong support and great opportunity from the department to develop and to teach new courses (**EE4601: Sensors for Biomedical Applications and EE4602: Bioelectronics**), which are closely relevant to my research areas. Integrating my teaching with my research interests helped keep my courses up-to-date, extend my research scopes more widely, and reinforce my strength as a professional scholar. In addition to teaching and developing new courses, I was involved in teaching one existing ECE course (**EE 3601: Bio-Instrumentation and Signal Analysis** from 2010 and also I participated in teaching two tutorials for the courses opened at the ECE and the MSE (Materials Science and Engineering) departments. Particularly, in 2005, to provide ECE and other bio-related engineering students, who pursuing a higher degree, with a course on "Magnetism in Medicine", I proposed one graduate course, **EE6605: Nanomagnetic Materials and Magnetism in Medicine**, which is my core research area in NUS, but it was not approved by the ECE department due to the sudden change of MOE (Ministry of Education) policy relevant to the future education roadmap in Singapore. My teaching responsibilities and the description for each course I have developed and taught for the past few years are briefly summarized below.

EE 4601 – Sensors for Biomedical Applications (Undergraduate/Graduate)
: Lecture, 4 MCs (Module Credits), 20 ~ 40 students in class
: Semester I, (2006, 2007. 2008, 2009, 2010, 2011, 2012)

General Corse Description: I designed and developed this course for third or fourth year ECE undergraduate and graduate students who are interested in the real applications of sensors for biomedical engineering. This course teaches the current state-of-the-art sensor technology in bioelectronics that has recently impacted and permeated in every aspect of our lives. The sensor technology provides a lot of driving force to the engineers who are involved in developing innovative devices in the field of bio-medical engineering, because all the current clinical treatments and diagnosis of patients are strongly related to bioelectronics. The trained students with the most up-to-date knowledge can contribute to both industry and academic researches by designing and developing new smart sensors in bioelectronics area.

Course evaluation: Course evaluations (available 2006 onward) for my main course are summarized in the table below. All the course evaluations are based on written evaluations.

Key: 5 (Outstanding), 4 (Good), 3 (Average), 2 (Fair), 1 (Poor)

	2006	2007	2008	2009	2010	2011	2012
The teacher has enhanced my thinking ability	4.138	3.714	4.182	4.105	4.417	4.500	4.500
The teacher provides timely and useful feedback	4.096	3.714	4.182	4.211	4.417	4.400	4.500
The teacher has helped me develop relevant research skills	N/A	N/A	N/A	N/A	N/A	N/A	N/A
The teacher approachable for consultation	4.586	4.000	4.273	4.158	4.417	4.400	4.000
The teacher has increased my interest in the subject	4.103	3.800	4.091	4.000	4.500	4.100	4.500
The teacher has helped me understand how to apply for it	4.096	3.571	3.909	4.000	4.500	4.300	4.500

The teacher has enhanced my ability to learn independently	4.138	3.762	4.182	4.053	4.417	4.300	4.333
OVERALL THE TEACHER IS EFFECTIVE	**4.069**	**3.667**	**4.182**	**4.053**	**4.417**	**4.400**	**4.500**

EE 4602 – Bioelectronics (Undergraduate/Graduate)

: Lecture, 4 MCs (Module Credits), 15 ~ 25 students in class

: Semester II, (2006, 2007, 2008, 2009)

General Corse Description: I designed and developed this course with another lecturer (50 % of the course was developed by me) for third or fourth year ECE undergraduate and graduate students who are interested in studies on the interface between electronics and biology/physiology of human bodies. This course is to provide ECE students as well as bio-related engineering students with crucial core knowledge to use advanced electronic devices and electronics as bio-sensing devices & bioinstrumentation measuring devices, and to understand the bioelectric phenomenon of human physiology and their biomedical applications. This course teaches the fundamental concepts and technologies in the field of bioelectronics and bioelectricity using MOSFET devices, equivalent circuit models, and SPICE modeling. The basic properties of biological materials and the bioelectric phenomenon of human physiology were introduced to provide a self-contained course. Biomedical and biotechnological applications for bimolecular detections and electronic interfaces for the bio-potential measurement were also discussed.

	2006	2007	2008	2009
The teacher has enhanced my thinking ability	3.744	3.647	4.286	4.500
The teacher provides timely and useful feedback	3.744	3.706	4.286	4.500
The teacher has helped me develop relevant research skills	N/A	N/A	N/A	N/A
The teacher approachable for consultation	3.968	3.706	4.429	4.000
The teacher has increased my interest in the subject	3.968	3.471	4.286	4.500
The teacher has helped me understand how to apply for it	3.871	3.353	4.286	4.500
The teacher has enhanced my ability to learn independently	3.806	3.353	4.286	4.333
OVERALL THE TEACHER IS EFFECTIVE	**3.935**	**3.412**	**4.286**	**4.500**

DEVELOPED COURSES

- **EE 4601: Sensors for Biomedical Applications** (Undergraduate/Graduate), AY: 2005
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **EE4602: Bioelectronics** (Undergraduate/Graduate), AY: 2005
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **EME 5607: Bioelectronic Materials and Devices** (Graduate), AY: 2008
  Department of Electronic Materials Engineering, Kwangwoon University, South Korea

PROPOSED COURSES (NOT APPROVED)

- **EE6605: Nanomagnetic Materials and Magnetism in Medicine** (Graduate), AY: 2006

- **EE44xx: Modern Solid State Device Technology for Biomedicine and Energy** (undergraduate), AY 2006

- **EE 45xx: Principle of Thin Films for Nanoelectronics**, (undergraduate), AU: 2006

TAUGHT COURSES

- **EE 4601: Sensors for Biomedical Applications** (Undergraduate/Graduate)
  Instructor (Semester I 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005)
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **EE4602: Bioelectronics** (Undergraduate/Graduate)
  Instructor (Semester II 2009, 2008, 2007, 2006, 2005)
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **EG 1108: Electrical Engineering** (undergraduate)
  Tutorial Class (Semester I/II, 2012, 2007, 2006, 2005)
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **MLE 1101: Introductory Materials Science & Engineering**, (Undergraduate)
  Tutorial Class (Semester II 2009, 2008)
  Department of Materials Science and Engineering, National University of Singapore

- **EE 3601: Bio-Instrumentation and Signal Analysis**, (Undergraduate)
  Instructor (Semester II 2011, 2010)
  Dept. of Electrical and Computer Engineering, National University of Singapore

- **EME 5607: Bioelectronic Materials and Devices** (Graduate)
  Instructor (Semester II 2008, 2009)
  Department of Electronic Materials Engineering, Kwangwoon University, South Korea

- **ELCT 891: Special Topics in Electrical Engineering: Biosensors in Medicine** (Graduate)
  Instructor (Fall Semester, 2015)
  Department of Electrical Engineering, University of South Carolina, USA

- **ELCT 363: Introduction to Microelectronics** (Undergraduate)
  Instructor (Spring Semester, 2016, Fall 2017)
  Department of Electrical Engineering, University of South Carolina, USA

- **ELCT 541: Sensors in Biomedicine** (Undergraduate/Graduate)
  Instructor (Spring Semester, 2017)
  Department of Electrical Engineering, University of South Carolina, USA

SERVICE

PROFESSIONAL AND ACADEMIC SOCIETY ACTIVITIES AND SERVICES

- **Program Committee (Organizing Committee),** The 16th International Congress of Hyperthermic Oncology (ICHO), (Apr. 12 ~ 16th), New Orleans, USA, (2016)

- **Member and Launching Member,** Korean Society for Nanomedicine, KOREA, (2012 ~ Present)

- **Vice Chair of Academic Committee**, Internal Symposium on Spintronic Devices and Commercialization (ISSDC), CHINA, (Oct. 2010)

- **Referee**, Qatar National Research Fund (QNRF), Qatar Foundation, QATAR, (2009 ~ Present)

- **Program Committee**, Asian Magnetics Conference (AMC), KOREA (2009)

- **Reviewers/Editorial committee member**, IETECH (International Engineering and Technology) (2007 ~ present)

- **Review Committee**, Internal Symposium on Advanced Magnetic Materials and Applications (ISMMA), KOREA, (2007)

- **Review Committee**, Science and Engineering Research Council (SERC) Fund, A-STAR, Singapore Government, SINGAPORE, (2006 ~ 2013)

- **Member** of IEEE Engineering in Medicine and Biology Society, USA, (2006 ~ Present)

- **Member** of IEEE Magnetics Society, USA (1999 ~ Present)

- **Member** of American Physics Society, USA (1999 ~ Present)

- **Board Member** of INSIC (Spintronics and Read Sensor Area), USA (2005 ~ 2006)

- **Reviewers** of more than 20 peer reviewed Journals (2000 ~ Present);
  - Nature Nanotechnology
  - Nature Materials
  - Nature-Scientific Reports
  - Advanced Materials
  - Biomaterials
  - Biosensors and Bioelectronics
  - Sensors and Actuators A
  - Journal of Nanoscience and Nanotechnology
  - Journal of Applied Physics
  - Applied Physics Letters
  - IEEE Sensors Journal
  - IEEE Transactions on Magnetics
  - IEEE Transactions on Electron Devices & Device Letters
  - Materials Research Bulletin
  - Journal of Nanotechnology

- Sensors Letters
- Materials Chemistry and Physics
- Materials Science and Engineering B
- Small Scale
- Nanotechnology, (Institute Of Physics, IOP)
- Journal of Physics D: Appl. Phys.
- Japanese Journal of Applied Physics
- Nanomedicine