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Cullen College of Engineering, University of Houston
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Education

- Ph.D. Materials Science and Engineering, the University of Texas at Austin, 2001
Area Solid-State Electronic Materials (Advisor: Dr. Russell D. Dupuis)
Thesis III-phosphide self-assembled semiconductor quantum dots grown by metalorganic chemical vapor deposition
- M.S. Metallurgical Engineering, Yonsei University, Seoul, Korea, 1995
Area Solid Phase Transformations (Advisor: Dr. Chong Sool Choi)
Thesis Effect of deformation degree on damping capacity and hardness of an austenitic stainless steel
- B.S. Metallurgical Engineering, Yonsei University, Seoul, Korea, 1993

Professional Experiences

- University of Houston, Houston, Texas
Associate Professor Sep. 2018 – present
Assistant Professor Sep. 2012 – Aug. 2018
Department of Mechanical Engineering
Materials Science and Engineering Program
Texas Center for Superconductivity at the University of Houston (TcSUH)
Advanced Manufacturing Institute (AMI)
- Georgia Institute of Technology, Atlanta, Georgia
Adjunct Assistant Professor Sep. 2010 – Aug. 2012
School of Electrical and Computer Engineering (ECE), College of Engineering
- Georgia Institute of Technology, Atlanta, Georgia
Principal Research Engineer Jul. 2012 – Aug. 2012
Senior Research Engineer Jul. 2007 – Jun. 2012
Research Engineer II Aug. 2003 – Jun. 2007
Center for Compound Semiconductors (CCS), Institute for Electronics and Nanotechnology (IEN)
- Honeywell International, Plymouth, Minnesota
Research Scientist III Aug. 2001 – Jul. 2003
Research and Development, Honeywell VCSEL Optical Products (Honeywell VCSEL) and
Honeywell Technology Center (HTC)

University of Texas at Austin, Austin, Texas

Graduate Research Assistant

Jun. 1997 – Aug. 2001

Microelectronics Research Center, Department of Electrical and Computer Engineering (ECE)

PROFESSIONAL RECOGNITION

Academic Honors and Activities

Teaching Excellence Award, University of Houston Cullen College of Engineering	May 2017
Roger P. Webb Research Spotlight Award, Georgia Institute of Technology	Apr. 2011
Korean Government Overseas Scholarship Granted for 3 years (Sep. 1996 – Aug. 1999)	Oct. 1995
POSCO Research Paper Award For identifying correlation between microstructure and damping behavior of alloys	Jan. 1995
Daewoo Engineering Fellowship Granted for 1 year (Mar. 1994 – Feb. 1995)	Mar. 1994

Professional Activities/Service

Editor of Books and Journals

- Associate Editor: *Optics Express*, Optical Society of America (OSA), Nov. 2013 – Nov. 2016 (2nd term).
- Associate Editor: *Optics Express*, Optical Society of America (OSA), Nov. 2010 – Nov. 2013 (1st term).
- Guest Co-Editor: Special issue of *Physica Status Solidi C: Current Topics in Solid-State Physics, The Proceedings of the ISGN-5 (5th International Symposium on Growth of III-Nitrides)*, **12** (4-5) 331–333 (2015).
- Guest Co-Editor: *Energy Express*, Focus Issue: Optics in LEDs for Lighting, OSA, Jul. 2011.

Technical Conference Committee

- Member of Program Committee, *ISGN-6 (6th International Symposium on Growth of III-Nitrides)*, Hamamatsu, Japan, Nov. 2015.
- Co-Chair of Publications Committee, *ISGN-5 (5th International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.

Summary

Publications

Authors or coauthors (as of Nov. 1, 2018):

- 6 book chapters of books
- >180 technical published papers in refereed journals
 - ✓ Citations of >4350
 - ✓ h-index of 32
 - ✓ i10-index of 105
- >250 contributed/invited presentations in technical conferences
 - ✓ 8 invited presentations in international conferences
- 9 US patents granted and 3 US patent applications filed
- ~50 invited seminar presentations in academic institutions/industry/national labs

Research Projects

Leads research activities (as of Nov. 1, 2018):

- 14 sponsored research projects as a PI
- 15 sponsored research projects as a Co-PI

Publications (Books and Book Chapters)

Bold in invitation for leading/corresponding author/presenter of invited book chapters, articles, papers, and presentations

Books

1. (*Invited book*) **Jae-Hyun Ryou*** and Shahab Shervin, *Flexible Devices Based on III-V Semiconductors - Applications in Electronics, Photonics and Energy*, Springer International Publishing AG, Cham, Switzerland (in preparation).
2. (*Editor, Conference Proceeding*) Christian Wetzel, **Jae-Hyun Ryou**, and Michael Manfra, Ed., Special issue of *Physica Status Solidi C: Current Topics in Solid-State Physics*, The Proceedings of the ISGN-5 (5th International Symposium on Growth of III-Nitrides), **12** (4-5), (2015).

Book Chapters

(Since joining UH)

1. (*Invited book chapter*) Theeradetch Detchprohm, **Jae-Hyun Ryou**, Xiaohang Li, and Russell D. Dupuis, "Chapter 14. Future aspects of MOCVD technology," *Metalorganic Vapor Phase Epitaxy*

- (MOVPE): *Growth, Materials Properties and Applications*, S. J. C. Irvine, P. Capper, S. Kasap, and A. Willoughby, Ed., Wiley, Hoboken, New Jersey, U.S.A. (2019) (ISBN-12: 978-11193130).
2. **(Invited book chapter) Jae-Hyun Ryou*** and Wonseok Lee, "Chapter 3. GaN on sapphire substrates for visible light-emitting diodes," *Nitride Semiconductor Light-Emitting Diodes (LEDs): Materials, Technologies, and Applications*, 2nd Ed., J. J. Huang, H.-C. Kuo, and S.-C. Shen, Ed., Elsevier, Amsterdam, Netherlands (2017) (ISBN-13: 978-0081019429).
 3. **(Invited book chapter) Jae-Hyun Ryou***, "Chapter 3. Gallium nitride (GaN) on sapphire substrates for visible LEDs," *Nitride Semiconductor LEDs: Materials, Performance and Applications*, J. J. Huang, H.-C. Kuo, and S.-C. Shen, Ed., Woodhead Publishing, Cambridge, U.K. (2013) (ISBN-13: 978-0857095077).
- (Before joining UH)
4. **(Invited book chapter) Shyh-Chiang Shen, Jae-Hyun Ryou,** and Russell D. Dupuis, "Chapter 13. GaN/InGaN heterojunction bipolar transistors using a direct-growth technology," *Nano-Semiconductors: Devices and Technology*, K. Iniewski, Ed., CRC Press, New York, New York, U.S.A. (2011) (ISBN-13: 978-1439848357).
 5. **(Invited book chapter) Jae-Hyun Ryou,** Ravi Kanjolila, and Russell D. Dupuis, "Chapter 6. CVD of III-V compound semiconductors," *Chemical Vapour Deposition: Precursors, Processes, and Applications*, A. Jones and M. L. Hitchman Ed., RSC (Royal Society of Chemistry) Publishing, Cambridge, U.K. (2009) (ISBN-13: 978-0854044658).
 6. **(Invited book chapter) Jae-Hyun Ryou,** Shyh-Chiang Shen, and Russell D. Dupuis, "Chapter 10. Ultraviolet photodetectors based on III-nitride semiconductors," *Advanced Semiconductor Materials and Devices Research - SiC and III-Nitrides*, H. Cha, Ed., Research Signpost, India (2009) (ISBN-13: 978-8178953717).

Publications (Peer-Reviewed Journal Papers)

* Corresponding author

Underlined for student advised at UH

Dotted-underlined for post-doctoral fellow advised at UH

Submitted

1. Y. Li, S. Sun, Y. Gao, Y. Yao, E. Galstyan, P. Rudra, M. Rathi, P. Dutta, S. Pouladi, **J.-H. Ryou**, and V. Selvamanickam, "Significant texture improvement in silver and two-step germanium thin films for direct epitaxy of single-crystalline-like materials on low-cost flexible metal tapes," (manuscript in preparation).
2. D. Khatiwada, M. Rathi, P. Dutta, Y. Yao, Y. Li, S. Pouladi, **J.-H. Ryou**, and V. Selvamanickam, "Passivation studies on single junction GaAs thin film solar cells on flexible metal tapes for low cost photovoltaics," *J. Mater. Chem. C* (submitted in Nov. 2018).
3. Y. Li, Y. Gao, Y. Yao, S. Sun, D. Khatiwada, S. Pouladi, E. Galstyan, M. Rathi, P. Dutta, A. Lytvynchuk, **J.-H. Ryou**, and V. Selvamanickam, "Direct epitaxial growth of nickel disilicide thin films on flexible, low-cost metal tapes by magnetron sputtering," *Appl. Phys. Lett.* (submitted in Nov. 2018).
4. S. Pouladi, M. Asadirad, S. K. Oh, S. Shervin, J. Chen, W. Wang, C.-N. Manh, R. Choi, J. Kim, D. Khatiwada, M. Rathi, P. Dutta, V. Selvamanickam, and **J.-H. Ryou***, "Effects of grain boundaries on conversion efficiencies of single-crystal-like GaAs thin-film solar cells directly deposited on flexible metal tapes," *Sol. Energy Mater. Sol Cells* (submitted in Nov. 2018).

5. Y.-L. Chang, J. Chen, S. K. Oh, S. Shervin, S. Pouladi, W. Wang, D. Khatiwada, V. Selvamanickam, and **J.-H. Ryou***, "Piezoelectric pressure sensor made of III-N thin film," *Electron. Lett.* (submitted in Nov. 2018).
6. J. Chen, S. K. Oh, N. Nabulsi, H. Johnson, W. Wang, and **J.-H. Ryou***, "Biocompatible and sustainable power supply for self-powered wearable and implantable electronics using flexible III-nitride thin-film-based piezoelectric generator," *Nano Energy* (submitted in Nov. 2018).
7. Z. Ren, Y. Lu, H.-H. Yao, H. Sun, C.-H. Liao, J. Dai, C. Chen, **J.-H. Ryou**, J. X. Yan, J. Wang, J. Li, and X. Li, "III-nitride deep UV LED without electron blocking layer," *ACS Photon.* (submitted in Sep. 2018).
8. P. Dutta, M. Rathi, D. Khatiwada, S. Sun, Y. Yao, B. Yu, S. Reed, M. Kacharia, J. Martinez, S. Pouladi, **J.-H. Ryou**, Z. Pasala, S. Hubbard, and V. Selvamanickam, "Enhanced efficiency in flexible GaAs solar cells on epitaxial Ge films made by roll-to-roll chemical vapor deposition on metal foils," *Energy Environ. Sci.* (submitted in Sep. 2018).
9. S. M. Lee, W. Wang, C. W. Bielawski, E. S. Larsen, S. Shervin, **J.-H. Ryou**, J. H. Yum, and J.-W. Oh, "Atomic layer deposition of wurtzite BeO thin films on GaN and ZnO substrates," *Mater. Character.* (submitted in May 2018).

Accepted

10. S. M. Lee, J. H. Yum, E. S. Larsen, S. Shervin, W. Wang, **J.-H. Ryou**, C. W. Bielawski, and J.-W. Oh, "Domain epitaxy of crystalline BeO films on GaN and ZnO substrates," *J. Am. Ceram. Soc.* (accepted in Oct. 2018; doi: 10.1111/jace.16198).
11. (*Invited review paper*) S. K. Oh, J. S. Lundh, S. Shervin, B. Chatterjee, D. K. Lee, S. Choi, J. S. Kwak, and **J.-H. Ryou***, "Thermal management and characterization of high-power wide-bandgap semiconductor electronic and photonic devices in automotive applications," *J. Electron. Packaging* (accepted in Jul. 2018, doi: 10.1115/1.4041813).
12. S. Pouladi, M. Rathi, D. Khatiwada, M. Asadirad, S. K. Oh, P. Dutta, Y. Yao, Y. Gao, S. Sun, Y. Li, S. Shervin, K. H. Lee, V. Selvamanickam, and **J.-H. Ryou***, "High-efficiency flexible III-V thin-film photovoltaic solar cells based on single-crystal-like thin-film directly grown on metallic tapes," *Prog. Photovoltaics: Res. Appl.* (accepted in Jul. 2018, doi: 10.1002/pip.3070).

Published

(Since joining UH)

13. S. M. Lee, J. H. Yum, E. S. Larsen, W. Wang, **J.-H. Ryou**, H.-S. Kim, H. Cha, C. W. Bielawski, and J.-W. Oh, "Atomic layer deposition of crystalline BeO on SiC," *Appl. Surf. Sci.* **469**, 634–640 (2018).
14. Y. Li, H. Guo, Y. Yao, P. Dutta, M. Rathi, N. Zheng, A. Khadimallah, Y. Gao, S. Sun, **J.-H. Ryou**, P. Ahrenkiel, and V. Selvamanickam, "Defect reduction by liquid phase epitaxy of germanium on single-crystalline-like germanium templates on flexible, low-cost metal substrates," *Cryst. Eng. Comm.* **20** (41), 6573–6579 (2018).
15. H. Sun, D. Priante, J.-W. Min, C. Zhao, M. K. Shakfa, R. C. Subedi, Z. Ren, K.-H. Li, R. Lin, T. K. Ng, **J.-H. Ryou**, X. Zhang, B. S. Ooi, and X. Li, "Graded-index separated confinement heterostructure AlGaIn nanowires: Towards ultraviolet laser diodes implementation," *ACS Photon.* **5** (8), 3305–3314 (2018).
16. S. Singh, S. Shervin, H. Sun, M. Yarali, J. Chen, R. Lin, K.-H. Li, X. Li, **J.-H. Ryou**, and A. Mavrokefalos, "Using mosaicity to tune thermal transport in polycrystalline AlN thin films," *ACS Appl. Mater. Interfaces* **10** (23), 20085–20094 (2018).

17. T. K. Kim, M. U. Cho, S. K. Oh, K. J. Son, B. Chatterjee, **J.-H. Ryou**, S. Choi, and J. S. Kwak, "Improved light output power of 16×16 pixelated micro-LEDs for headlights by enhancing the reflectivity and coverage of the *p*-electrode," *Phys. Status Solidi A* **215** (10), 1700571-1–5 (2018). [*Featured cover article in issue 10 of volume 215 (May, 2018)*]
18. J. Chen, S. K. Oh, H. Zou, S. Shervin, W. Wang, S. Pouladi, Y. Zi, Z. L. Wang, and **J.-H. Ryou***, "High-output lead-free flexible piezoelectric generators based on GaN thin film," *ACS Appl. Mater. Interfaces* **10** (15), 12839–12846 (2018).
19. K. J. Son, T. K. Kim, Y.-J. Cha, S. K. Oh, S.-J. You, **J.-H. Ryou**, and J. S. Kwak, "Impact of electron flux on plasma damage-free sputtering of ultrathin indium-tin-oxide contact layer on p-GaN for InGaN/GaN light-emitting diodes," *Adv. Sci.* **5** (2), 1700637-1–10 (2018).
20. S. Shervin, S. K. Oh, H. J. Park, K.-H. Lee, M. Asadirad, S. H. Kim, J. Kim, S. Pouladi, S.-N. Lee, X. Li, J. S. Kwak, and **J.-H. Ryou***, "Flexible deep-ultraviolet light-emitting diodes for significant improvement of quantum efficiencies by external bending," *J. Phys. D: Appl. Phys.* **51** (10), 105105-1–7 (2018).
21. W. Lee, S. Muhammad, T. Kim, H. Kim, E. Lee, M. Jeong, S. Son, **J.-H. Ryou**, and W. S. Yoon, "New insight into Ni-rich layered structure for next-generation Li rechargeable batteries," *Adv. Energy Mater.* **8** (4), 1701788-1–12 (2018). [*Featured cover article in issue 4 of volume 8 (February, 2018)*]
22. S. Jeong, S. K. Oh, **J.-H. Ryou**, K.-S. Ahn, K. M. Song, and H. Kim, "Monolithic inorganic semiconductor heterojunction white light-emitting diodes," *ACS Appl. Mater. Interfaces* **10** (4), 3761–3768 (2018).
23. S. M. Lee, J. H. Yum, S. Yoon, E. S. Larsen, W. C. Lee, S. K. Kim, S. Shervin, W. Wang, **J.-H. Ryou**, C. W. Bielawski, and J. Oh, "Atomic layer deposition of single-crystalline BeO epitaxially grown on GaN substrates," *ACS Appl. Mater. Interfaces* **9** (48), 41973–41979 (2017).
24. S. Sing, M. Yarali, S. Shervin, V. Venkateswaran, K. Olenick, J. A. Olenick, **J.-H. Ryou**, and A. Mavrokefalos, "Temperature-dependent thermal conductivity of flexible yttria-stabilized zirconia substrate via ω technique," *Phys. Status Solidi A* **214** (10), 1700069-1–5 (2017). [*Featured back cover article in issue 10 of volume 214 (October, 2017)*]
25. S. K. Oh, M. U. Cho, J. Dallas, T. Jang, D. G. Lee, S. Pouladi, J. Chen, W. Wang, S. Shervin, H. Kim, S. Shin, S. Choi, J. S. Kwak, and **J.-H. Ryou***, "High-power flexible AlGaIn/GaN heterostructure field-effect transistors with negative differential conductivity suppression," *Appl. Phys. Lett.* **111** (13), 133501-1–5 (2017).
26. M. Rathi, P. Dutta, N. Zheng, Y. Yao, D. Khatiwada, Y. Gao, S. Sun, Y. Li, S. Pouladi, P. Ahrenkiel, **J.-H. Ryou**, and V. Selvamanickam, "High opto-electronic quality n-type single-crystalline-like GaAs thin films on flexible metal substrates," *J. Mater. Chem. C* **5** (31), 7919–7926 (2017).
27. M. Baek, M. Oh, B. Parida, M. S. Kim, **J.-H. Ryou**, and H. Kim, "Hybrid oblique-angle deposited ITO/silver nanowire transparent conductive electrodes for brighter light emitters," *IEEE Trans. Electron Device.* **64** (9), 3690–3695 (2017).
28. E. Jung, S. Jeong, **J.-H. Ryou**, and H. Kim, "Deep-trap states of GaN-based light emitting diodes analyzed by space charge limited conduction model," *J. Nanosci. Nanotechnol.* **17** (10), 7339–7343 (2017).
29. M. Oh, H. J. Jeong, M. S. Jeong, K.-S. Ahn, K.-K. Kim, **J.-H. Ryou**, and H. Kim, "Functional hybrid indium-tin-oxide transparent conductive electrodes for light-emitters," *J. Alloy. Compound.* **724**, 813–819 (2017).
30. W. Wang, S. Shervin, S. K. Oh, J. Chen, Y. Huai, S. Pouladi, H. Kim, S.-N. Lee, and **J.-H. Ryou***, "Flexible AlGaInN/GaN heterostructures for high-hole-mobility transistors," *IEEE Electron Device Lett.* **38** (8), 1086–1089 (2017).

31. B. Parida, S. Kim, M. Oh, S. Jeong, M. K. Baek, **J.-H. Ryou**, and H. Kim, "Nanostructured NiO/Si heterojunction photodetector," *Mater. Sci. Semicon. Process.* **71**, 29–34 (2017).
32. S. Kim, K.-S. Ahn, **J.-H. Ryou**, and H. Kim, "Temperature-dependent DC characteristics of AlInN/GaN high-electron-mobility transistors," *Electron. Mater. Lett.* **13** (4), 302–306 (2017).
33. M. Asadirad, S. Pouladi, S. Shervin, S. K. Oh, K. H. Lee, J. Kim, S.-N. Lee, Y. Gao, P. Dutta, V. Selvamanickam, and **J.-H. Ryou***, "Numerical simulation for operation of flexible thin-film transistors with bending," *IEEE Electron Device Lett.* **38** (2), 217–220 (2017).
34. H. Brahmi, S. Ravipati, S. Shervin, W. Wang, **J.-H. Ryou**, and A. Mavrokefalos, "Electrical and optical properties of sub-10nm nickel silicide films for silicon solar cells," *J. Phys. D: Appl. Phys.* **50** (3), 035102-1–10 (2017).
35. J.-H. Lee, S.-H. Han, K.-R. Song, **J.-H. Ryou**, H. Na, and S.-N. Lee, "Effect of SiO₂ hexagonal pattern on the crystal and optical properties of epitaxial lateral overgrown semipolar (11-22) GaN film," *Microelectron. Eng.* **168**, 32–36 (2017).
36. S. K. Oh, T. Jang, S. Pouladi, Y. J. Jo, H.-Y. Ko, **J.-H. Ryou***, and J. S. Kwak, "Output power enhancement in AlGaN/GaN heterostructure field-effect transistors with multi-level metallization," *Appl. Phys. Express* **10** (1), 016502-1–3 (2017).
37. Y. Gao, M. Asadirad, Y. Yao, P. Dutta, E. Galstyan, S. Shervin, K. H. Lee, S. Pouladi, S. Sun, Y. Li, M. Rathi, **J.-H. Ryou***, and V. Selvamanickam, "High-performance flexible thin-film transistors based on single-crystal-like silicon epitaxially grown on metal tape by roll-to-roll continuous deposition process," *ACS Appl. Mater. Interfaces* **8** (43), 29565–29572 (2016).
38. S. H. Kim, K. H. Lee, H. J. Park, S. Shervin, M. Asadirad, S.-N. Lee, J. S. Kwak, and **J.-H. Ryou***, "Patterned Ga₂O₃ for current blocking and optical scattering in visible light-emitting diodes," *Phys. Status Solidi A* **213** (10), 2769–2772 (2016).
39. K.-H. Lee, M. Asadirad, S. Shervin, S. K. Oh, J. T. Oh, J.-O. Song, Y.-T. Moon, and **J.-H. Ryou***, "Thin-film-flip-chip LEDs grown on Si substrate using wafer-level chip-scale package," *IEEE Photon. Technol. Lett.* **28** (18), 1956–1959 (2016).
40. M. Asadirad, Y. Gao, P. Dutta, Y. Yao, S. Shervin, S. Sun, S. Ravipati, S.-H. Kim, K. H. Lee, V. Selvamanickam, and **J.-H. Ryou***, "High-performance flexible thin-film transistors based on single-crystal-like germanium on glass," *Adv. Electron. Mater.* **2** (8), 1600041-1–7 (2016). *[Featured frontispiece article in issue 8 of volume 2 (August, 2016)]*
41. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, S. Shervin, and **J.-H. Ryou**, "Effect of lattice-matched InAlGa_N electron-blocking layer on hole transport and distribution in InGa_N/Ga_N multiple quantum wells of visible light-emitting diodes," *Phys. Status Solidi A* **213** (5), 1296–1301 (2016).
42. S. H. Kim, S. Singh, S. K. Oh, D. K. Lee, K. H. Lee, S. Shervin, M. Asadirad, V. Venkateswaran, K. Olenick, J. Olenick, S.-N. Lee, J. S. Kwak, A. Mavrokefalos, and **J.-H. Ryou***, "Visible light-emitting diodes on flexible ceramic substrate with improved thermal management," *IEEE Electron Device Lett.* **37** (5), 615–617 (2016).
43. H. J. Park, H. J. Bae, J. B. Park, J. S. Ha, T. Jeong, J. H. Baek, S. H. Kim, and **J.-H. Ryou**, "Enhanced wall-plug efficiency in monolithically-integrated vertical light-emitting-diode cells based on III-nitride heterostructures," *J. Vac. Sci. Tech. B* **34** (2), 021206-1–5 (2016).
44. S. Shervin, S.-H. Kim, M. Asadirad, S. Yu. Kapov, D. Zimina, and **J.-H. Ryou***, "Bendable III-N visible light-emitting diodes beyond mechanical flexibility: Theoretical study on quantum efficiency improvement and color tunability by external strain," *ACS Photon.* **3** (3), 486–493 (2016). *[Featured cover article in issue 3 of volume 3 (March, 2016)]*
45. S. Kim, **J.-H. Ryou**, R. D. Dupuis, and H. Kim, "Reduced gate leakage current of AlInN:Mg/GaN high electron mobility transistors," *Electron. Lett.* **52** (2), 157–159 (2016).

46. X.-H. Li, H. Xie, F. A. Ponce, **J.-H. Ryou**, T. Detchprohm, and R. D. Dupuis, "Onset of surface stimulated emission at 260 nm at room temperature from AlGa_N multiple-quantum wells grown on sapphire substrate," *Appl. Phys. Lett.* **107** (24), 241109-1-4 (2015).
47. S. Shervin, S.-H. Kim, M. Asadirad, S. Ravipati, K.-H. Lee, K. Bulashevich, and **J.-H. Ryou***, "Strain-effect transistors: Theoretical study on the effects of external strain on III-nitride high-electron-mobility transistors on flexible substrates," *Appl. Phys. Lett.* **107** (19), 193504-1-5 (2015).
48. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **J.-H. Ryou**, A. K. Sood, N. K. Dhar, and J. Lewis, "Comparison of AlGa_N p-i-n ultraviolet avalanche photodiodes grown on free-standing GaN and sapphire substrates," *Appl. Phys. Express* **8** (12), 122202-1-4 (2015).
49. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, A. M. Fischer, F. A. Ponce, and **J.-H. Ryou**, "Effect of Group-III precursors on unintentional gallium incorporation during epitaxial growth of InAlN layers by metalorganic chemical vapor deposition," *J. Appl. Phys.* **118** (12), 125303-1-6 (2015).
50. K. H. Lee, H. J. Park, S. H. Kim, M. Asadirad, Y.-T. Moon, J. S. Kwak, and **J.-H. Ryou***, "Light extraction efficiency control in AlGa_N-based deep-ultraviolet flip-chip light-emitting diodes: A comparison to visible flip-chip light-emitting diodes," *Opt. Express* **23** (16), 20340-20349 (2015).
51. Y.-S. Liu, T.-T. Kao, Md. M. Satter, Z. Lochner, S.-C. Shen, T. Detchprohm, P. D. Yoder, R. D. Dupuis, **J.-H. Ryou**, A. M. Fischer, Y. O. Wei, H. Xie, and F. A. Ponce, "Inverse-tapered p-waveguide for efficient vertical hole transport in high-[Al] AlGa_N multiple-quantum well double-heterojunction emitters grown by metalorganic chemical vapor deposition on AlN substrates," *IEEE Photon. Technol. Lett.* **27** (16), 1768-1771 (2015).
52. K. H. Lee, S.-H. Kim, W.-S. Lim, J.-O. Song, and **J.-H. Ryou***, "Visible light-emitting diodes with thin-film-flip-chip-based wafer-level chip-scale package technology with anisotropic conductive film bonding," *IEEE Electron Device Lett.* **36** (7), 702-704 (2015).
53. J. Kim, M.-H. Ji, T. Detchprohm, **J.-H. Ryou**, R. D. Dupuis, A. K. Sood, and N. K. Dhar, "Al_xGa_{1-x}N ultraviolet avalanche photodiodes with avalanche gain greater than 10⁵ grown on GaN substrate," *IEEE Photon. Technol. Lett.* **27** (6), 642-645 (2015).
54. Y.-J. Yu, K. S. Kim, J. Nam, S. R. Kwon, H. Byun, K. Lee, **J.-H. Ryou**, R. D. Dupuis, J. Kim, G. Ahn, S. Ryu, M.-Y. Ryu, and J. S. Kim, "Temperature-dependent resonance energy transfer from semiconductor quantum wells to graphene," *Nano Lett.* **15** (2), 896-902 (2015).
55. H. M. Oh, C.-R. Lee, J. S. Kim, K. Pyun, K. J. Lee, M. S. Jeong, Y. H. Kim, J.-Y. Leem, and **J.-H. Ryou**, "Periodic variation in the electroluminescence intensity on a single pattern from InGa_N/Ga_N light-emitting diodes fabricated on lens-shaped patterns," *J. Kor. Phys. Soc.* **66** (2), 266-269 (2015).
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10 selected papers with citations (as of Oct. 1, 2018 based on Google Scholar):

#	Publication	Cite	
1	<i>Journal of the American Chemical Society</i> 127 , 7920 (2005).	268	
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† First author paper

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1. S. Pouladi, M. Rathi, P. Dutta, S. K. Oh, D. Khatiwada, Y. Yao, Y. Gao, S. Sun, Y. Li, M. Asadirad, S. Shervin, J. Chen, V. Selvamanickam, and **J.-H. Ryou***, "Toward higher efficiency of low-cost flexible single-crystal-like GaAs thin film solar cells on metal tapes," *Proc. 45th IEEE Photovoltaic Specialists Conference (PVSC-44)/The 7th World Conference on Photovoltaic Energy Conversion (WCPEC-7)*, (submitted in Jul. 2018).
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7. (*Invited paper*) **J.-H. Ryou***, J. Kim, S. Choi, H. J. Kim, Z. Lochner, M.-H. Ji, Md. M. Satter, T. Detchprohm, P. D. Yoder, R. D. Dupuis, M. Asadirad, J. P. Liu, J. S. Kim, A. M. Fischer, R. Juday, F. A. Ponce, M.-K. Kwon, D. Yuan, R. Guo, and S. Das, "Carrier dynamics and photon management for improvement in quantum efficiencies of GaN-based visible light-emitting diodes," *ECS Transactions* **61** (4), 109–116 (2014).

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2. S. Shervin, K. Alam, M. H. Ji, K. Shervin, J. Chen, W. Wang, S. Pouladi, S. K. Oh, M. H. Ji, T. Detchprohm, R. Forrest, J. Bao, R. D. Dupuis, and **J.-H. Ryou***, "Flexible single-crystal III-N thin-film heterostructure on metal tape by direct deposition" (GR10-2), *International Workshop on Nitride Semiconductors (IWN 2018)*, Kanazawa, Japan, Nov. 2018.
3. J. S. Lundh, S. K. Oh, J. S. Kwak, **J.-H. Ryou**, and S. Choi, "Thermal characteristics of high-power flexible AlGaIn/GaN high electron mobility transistors," *2018 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, San Francisco, California, Aug. 2018.
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R&D Projects and Grants (As PI or Co-PI)

Principal Investigator (PI)

1. Flexible Light-Emitting Diodes on Single-Crystalline III-Nitride/Metal Tape for Low-Cost High-Efficiency and Versatile-Application Solid-State Lighting, PI, Sep. 2018 – Aug. 2019, UH, Technology Gap Fund.
2. New Materials for Advanced Photonic, Electronic, Energy, and Biomedical Applications, PI, Sep. 2018 – Aug. 2019, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
3. EAGER: Flexible III-N High-Electron-Mobility Transistors with External Bending Strains for Multi-Functional Mechano-Electro-Photonic Wide-Bandgap Semiconductor Devices, PI, Sep. 2018 – Feb. 2020, UH, National Science Foundation (NSF), ECCS.
4. Design of Epitaxial Structures of Vertical-Cavity Surface-Emitting Lasers (VCSELs) Based on GaAs Materials, PI, Mar. 2017 – Dec. 2018, UH, LG Innotek.
5. Development of Energy Materials and Devices for Flexible High-Quality Multi-Functional Photonics and Electronics, PI, Sep. 2017 – Aug. 2018, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).

6. Development of Epitaxial Structure Design and Growth Technology of Semiconductor Lasers, PI, Jun. 2017 – Dec. 2017, UH, LG Innotek.
7. X-ray Diffraction Analysis of Semiconductor Superlattice Structures, PI, Nov. 2016 – Jan. 2017, UH, Applied Optoelectronics Inc.
8. Analysis of Amorphous Carbon Films on TEOS/Si Substrates, PI, Nov. 2016 – Dec. 2016, UH, TEL Technology Center America.
9. Development of Energy Materials and Devices for Flexible High-Performance Multi-Functional Photonics and Electronics, PI, Sep. 2016 – Aug. 2017, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
10. Development of Epitaxial Structure Design and Epitaxial Growth system for High-Voltage Power Semiconductors, PI, Jul. 2014 – Jun. 2017, UH, Korea Evaluation Institute of Industrial Technology (KEIT), subcontract from TES Inc.
11. Development of Flexible Photonic and Electronic Devices Based on III-N Heterostructures, PI, Sep. 2012 – Aug. 2015, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
12. Epitaxial Structure Development for III-Nitride-Based Schottky Junction Power Devices, PI, 2008 – 2009, Georgia Tech, Alpha and Omega Semiconductors.
13. Advanced HFET Devices and Circuits for High-Performance, High-Reliability RF Devices, PI, 2004 – 2005, Georgia Tech, Defense Advanced Projects Agency (DARPA), subcontract from Magellus Corp.
14. Development of Commercial 650-nm Red VCSEL, PI, 2001 – 2003, Honeywell Technology Center (HTC).

Co-Principal Investigator (Co-PI)

15. Investigation of Controlled Bending Strain in Deep UV LED Efficiency, Co-PI, Apr. 2017 – Mar. 2021, King Abdallah University of Science and Technology (KAUST).
16. Physical Property Measurement System, Co-PI, Aug. 2015 – Aug. 2016, Office of Naval Research (ONR), DURIP Program.
17. High Efficiency, Inexpensive Thin Film III-V Photovoltaics Using Single-Crystalline-Like, Flexible Substrates, Co-PI, Oct. 2014 – Sep. 2018, UH, US Department of Energy (DoE), Energy Efficiency and Renewable Energy (EERE).
18. Advanced Middle-UV Coherent Optical Sources, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), CMUVT program.
19. Fundamental Study of Defect Reduction in Type-II Superlattice Materials, Co-PI, 2010 – 2012, Georgia Tech, Army Research Office (ARO), MURI.
20. Collaborative Research: Nanobeam Lasers, Co-PI, 2010 – 2012, Georgia Tech, National Science Foundation (NSF), ECCS.
21. Growth and Development of High Performance UV Imaging Focal Plane Arrays, Co-PI, 2010 – 2014, Georgia Tech, Defense Advanced Projects Agency (DARPA), SBIR, subcontract from Magnolia Optical Technologies.
22. Development of Nitride Electronic Next Generation Technology, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), NeXT program, subcontract from HRL.
23. E-Mode III-Nitride High-Voltage Transistor Development, Co-PI, 2009 – 2012, Georgia Tech, Intersil Corp.

24. Development of High-Voltage GaN-Based DC-DC Converter for Radio Isotope Micro-Power Sources, Co-PI, 2009 – 2010, Georgia Tech, Defense Advanced Projects Agency (DARPA), RIMS program, subcontract from Trace Photonics.
25. MOCVD Growth of Advanced III-N HFETs on Bulk GaN Substrates, Co-PI, 2009 – 2010, Georgia Tech, Air Force Research Lab (AFRL), subcontract from Kyma Technologies.
26. Fundamental Studies and Development of III-N Visible Light Emitting Diodes for High-Power Solid-State Lighting Applications, Co-PI, 2008 – 2011, Georgia Tech, US Department of Energy (DoE), Energy Efficiency and Renewable Energy (EERE).
27. Novel High-Performance III-N HBTs for Next-Generation Energy-Efficiency Systems, Co-PI, 2007 – 2011, Georgia Tech, National Science Foundation (NSF), ECCS.
28. Development of High-Efficiency InGaN-Based Green Lasers, Co-PI, 2007 – 2010, Georgia Tech, Defense Advanced Projects Agency (DARPA), VIGIL program.
29. Development of Advanced Deep-UV Geiger-Mode Avalanche Photodiodes Arrays for Critical Sensing Applications, Co-PI, 2006 – 2008, Georgia Tech, Defense Advanced Projects Agency (DARPA), DUVAP program.

Patents/Invention Disclosures

Patents Granted

1. **Jae-Hyun Ryou**, "Flexible single-crystalline semiconductor device fabrication and methods of thereof," US Patent **9831273** (Nov. 27, 2017).
2. Daniel Guidotti, Gee-Kung Chang, **Jae-Hyun Ryou**, and Russell D. Dupuis, "Edge viewing photo detector and method of making same," US Patent **7482667** (Jan. 27, 2009).
3. Tzu-Yu Wang, Hoki Kwon, **Jae-Hyun Ryou**, Gyoungwon Park, and Jin K. Kim "InP-based long wavelength VCSEL," US Patent **7433381** (Oct. 7, 2008).
4. Tzu-Yu Wang, Jin K. Kim, Hoki Kwon, Gyoungwon Park, and **Jae-Hyun Ryou**, "Carrier bonded 1550nm VCSEL with InP substrate removal," US Patent **7286584** (Oct. 23, 2007).
5. **Jae-Hyun Ryou** and Gyoungwon Park, "Dielectric VCSEL gain guide," US Patent **7277461** (Oct. 2, 2007).
6. **Jae-Hyun Ryou**, "Pseudomorphic layer in tunnel junction," US Patent **7136406** (Nov. 14, 2006).
7. **Jae-Hyun Ryou**, Michael D. Ringle, and Yue Liu, "VCSEL having thermal management," US Patent **7075962** (Jul. 11, 2006).
8. **Jae-Hyun Ryou**, Tzu-Yu Wang, Jin K. Kim, Gyoungwon Park, and Hoki Kwon, "Enhanced lateral oxidation," US Patent **7054345** (May 30, 2006).
9. Ying-Lan Chang, Scott W. Corzine, Russell D. Dupuis, Min Soo Noh, **Jae-Hyun Ryou**, Michael R. T. Tan, and Ashish Tandon, "Long-wavelength photonic devices with GaAsSb quantum-well layers," US Patent **6711195** (Mar. 23, 2004).

Patent Applications Filed

10. **Jae-Hyun Ryou**, Jie Chen, Seung Kyu Oh, and Shahab Shervin, "Fabrication and use of III-nitride thin-film-based piezoelectric devices," (provisional patent filed to US PTO in Oct. 2017 (UHID: 2017-059; Application #: 62571040; Doc #: 2483-10400)).

11. **Jae-Hyun Ryou** and Shahab Shervin, "Flexible single-crystal semiconductor heterostructures by direct growth and methods of making thereof," (international PCT filed to US PTO in Sep. 2017 (UHID: 2016-048; Application #: PCT/US2017/050844; Doc #: 2483-08601)).
12. **Jae-Hyun Ryou**, Shahab Shervin, and Seung-Hwan Kim, "Externally-strain-engineered semiconductor photonic and electronic devices and methods of making thereof and assemblies thereof," (international PCT filed to US PTO in Apr. 2016 (UHID: 2015-033; Application #: PCT/US16/26707; Doc #: 2483-07001)).

Invention Disclosures Filed

- 13.

Invited Lecture/Seminar Presentations

1. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Jan. 2018.
2. **Korea Photonics Research Institute (KOPTI)**, Gwangju, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Jan. 2018.
3. **Hanyang University**, Department of Materials Science and Engineering, Seoul, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Dec. 2017.
4. **LG Innotek**, Paju, Korea, "Fundamentals of vertical-cavity surface emitting lasers," Sep. 2017.
5. **Korea Electronics Technology Institute**, Seongnam, Korea, "High-performance multifunctional flexible semiconductor devices," Sep. 2017.
6. **LG Innotek**, Paju, Korea, "Fundamentals of semiconductor laser diodes," May 2017.
7. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, "Metalorganic chemical vapor deposition of III-V compound semiconductors," May 2017.
8. **Samsung Advanced Institute of Technology**, Suwon, Korea, "High-performance flexible electronics based on single-crystal-like semiconductor thin films," May 2017.
9. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "TcSUH Bi-Weekly Seminar Series: New functional semiconductor materials and devices," Oct. 2016.
10. **Korea Polytechnic University**, Department of Nano-Optical Engineering, Siheung, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.
11. **Seoul VIOSYS Co., Ltd.**, Ansan, Korea, "New trend in III-N-based photonic devices," Aug. 2016.
12. **Seoul National University**, School of Materials Science and Engineering, Seoul, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.
13. **Pohang University of Science and Technology**, School of Materials Science and Engineering, Pohang, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.
14. **Chonnam National University**, School of Materials Science and Engineering, Gwangju, Korea, "New functional semiconductor materials and electronic devices," May 2016.
15. **SungKyunKwan University**, Department of Energy Science, Suwon, Korea, "Semiconductor materials for energy science and applications," Feb. 2016.
16. **Hongik University**, School of Electronic and Electrical Engineering, Seoul, Korea, "New functional semiconductor materials and electronic devices," Nov. 2015.

17. **National Oilwell Varco**, Houston, Texas, "Active materials and devices based on semiconductors," Nov. 2015.
18. **Sunchon National University**, Department of Printed Electronics Engineering, Sunchon, Korea, "New functional semiconductor materials and devices," Oct. 2015.
19. **Applied Optoelectronics Inc.**, Sugar Land, Texas, "Metalorganic chemical vapor deposition, An introduction," Sep. 2015.
20. **Georgia Institute of Technology**, School of Electrical and Computer Engineering, Atlanta, Georgia, "New functional semiconductor materials and devices," Jul. 2015.
21. **Korea Institute of Science and Technology (KIST)**, Post-Silicon Semiconductor Institute, Seoul, Korea, "New functional semiconductor materials and devices," May 2015.
22. **Korea Institute of Ceramic Engineering and Technology (KICET)**, Jinju, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors grown by metalorganic chemical vapor deposition," May 2015.
23. **Korea Advanced NanoFab Center (KANC)**, Suwon, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors grown by metalorganic chemical vapor deposition," May 2015.
24. **Yonsei University**, School of Integrated Technology, Incheon, Korea, "Historical perspectives of semiconductor technology development and new functional semiconductor materials and devices," May 2015.
25. **Yonsei University**, School of Materials Science and Engineering, Seoul, Korea, "New functional semiconductor materials and devices," May 2015.
26. **SungKyunKwan University**, Graduate Program of Energy System Engineering, Suwon, Korea, "Energy-saving semiconductor materials and devices," Feb. 2015.
27. **Chonbuk National University**, Division of Advanced Materials Engineering, School of Semiconductors and Chemical Engineering, Semiconductor Physics Research Center, Jeonju, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.
28. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.
29. **LG Innotek**, Paju, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.
30. **Hanyang University**, Department of Electronics and Communication Engineering, Ansan, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.
31. **Korea Polytechnic University**, Department of Nano-Optical Engineering, Siheung, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.
32. **Electronics and Telecommunications Research Institute (ETRI)**, Daejeon, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors grown by metalorganic chemical vapor deposition," Jun. 2014.
33. **Yonsei University**, School of Integrated Technology, Incheon, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors grown by metalorganic chemical vapor deposition," Jun. 2014.
34. **University of Texas at Dallas**, Department of Materials Science and Engineering, Richardson, Texas, "Colloquium: Photonic and electronic materials and devices based on III-V compound semiconductors for green energy systems," Nov. 2013.
35. **Houston Chapter of IEEE Nanotechnology Council and Houston Chapter of IEEE Magnetics Society**, Houston, Texas, "Photonic and electronic materials and devices for greener way of energy harvesting and consumption based on III-V compound semiconductors," Sep. 2013.

36. **University of Houston**, Center for Integrated Bio and Nano Systems, Houston, Texas, "Nano/Materials Seminar Series: Photonic and electronic materials and devices for greener way of energy harvesting and consumption based on III-V compound semiconductors," Sep. 2013.
37. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "TcSUH Bi-Weekly Seminar Series: Photonic and electronic materials and devices for greener way of energy harvesting and consumption based on III-V compound semiconductors," Mar. 2013.
38. **University of Houston**, Department of Mechanical Engineering, Houston, Texas, "Graduate Seminar Series: III-V compound semiconductors and photonic devices for next-generation green technology," Nov. 2012.
39. **University of Houston**, Department of Mechanical Engineering, Houston, Texas, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technology and next-generation green technology," Jun. 2012.
40. **Applied Materials Inc.**, Santa Clara, California, "Photonic and electronic materials and devices based upon III-nitride compound semiconductors grown by metalorganic chemical vapor deposition: light emitters and transistors," Aug. 2011.
41. **Auburn University**, Department of Physics, Auburn, Alabama, "Physics Colloquium: Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Mar. 2011.
42. **Seoul National University**, Graduate School of Convergence Science and Technology, Suwon, Korea, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Jun. 2010.
43. **Samsung Advance Institute of Technology (SAIT)**, Giheung, Korea, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Jun. 2010.
44. **LG Innotek**, Seoul, Korea, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Jun. 2010.
45. **Gwangju Institute of Science and Technology (GIST)**, School of Materials Science and Engineering, Gwangju, Korea, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Jun. 2010.
46. **Georgia Institute of Technology**, School of Electrical and Computer Engineering, Atlanta, Georgia, "Photonic and electronic materials and devices based upon III-V compound semiconductors: Critical elements for current information technologies and next-generation green technologies," Nov. 2009.
47. **Samsung Electro-mechanics Inc.**, Suwon, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.
48. **Epivalley Inc.**, Gwangju, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.
49. **Samsung Advanced Institute of Technology (SAIT)**, Giheung, Korea, "Photonic and electronic materials and devices based on III-V Compound semiconductors," Jun. 2006.
50. **LG Institute of Electronics**, Seoul, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.

51. **Georgia Institute of Technology**, Packaging Research Center (PRC), Atlanta, Georgia, "III-V compound semiconductor based advanced light emitters for optical interconnect systems, etc.," Oct. 2004.

Publications (Magazine Articles)

(Since joining UH)

1. (*Invited article*) **Jae-Hyun Ryou**, Russell Dupuis, P. Douglas Yoder, and Fernando Ponce, Technology: LED Droop, "Diminishing droop with superior electron-blocking layers," *Compound Semiconductors* **19** (7), October, 48–52 (2013).

Student Seminar/Symposium Presentations

(Since joining UH)

1. **J. Chen**, **N. Nabulsi**, **H. Johnson**, and **J.-H. Ryou**, "III-nitride thin-film-based flexible piezoelectric generator," *The 2nd UH-MRS Chapter Student Symposium*, University of Houston, Houston, Texas, Sep. 2018.
2. **J. Chen** and **J.-H. Ryou**, "Bio-compatible flexible III-N thin-film piezoelectric generators," *The 54th TcSUH Semiannual Student Symposium*, University of Houston, Houston, Texas, Dec. 2017.
3. **S. Pouladi** and **J.-H. Ryou**, "Next-generation solar cells," *The 3rd Annual Graduate Research and Scholarship Projects (GRaSP) Day*, University of Houston, Houston, Texas, Nov. 2017.
4. **S. Pouladi** and **J.-H. Ryou**, "Flexible III-V photovoltaics based on single-crystal-like materials grown on low-cost metal tape," *The 53rd TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2017 [*Symposium Winner (3rd Place)*].
5. **S. Pouladi**, **M. Rathi**, **M. Asadirad**, **V. Selvamanickam**, and **J.-H. Ryou**, "III-V thin-film photovoltaic solar cells on flexible metal tapes," *The 1st UH-MRS Chapter Student Symposium*, University of Houston, Houston, Texas, Apr. 2017.
6. **S. Shervin** and **J.-H. Ryou**, "Direct growth of single-crystal-like III-nitride materials on metal tapes for flexible electronics and photonics," *The 52nd TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Dec. 2016 [*Symposium Winner (2nd Place)*].
7. **S. Pouladi** and **J.-H. Ryou**, "Flexible GaAs solar cells bases on single-crystal-like materials on low-cost tapes," *The 51st TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2016.
8. **M. Asadirad** and **J.-H. Ryou**, "High-mobility single-crystal-like Si and Ge thin-film transistors on flexible templates for next-generation flexible electronics," *The 50th TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Dec. 2015.
9. **S. Shervin**, **W. Wang**, **M. Asadirad**, **S. H. Kim**, and **J.-H. Ryou**, "Flexible LEDs: Simulation study on the effect of external strain on internal quantum efficiency and emission wavelength," *The 2nd Graduate Research and Scholarship Projects (GRaSP) Day*, University of Houston, Houston, Texas, Oct. 2015.

10. S. Shervin and **J.-H. Ryou**, "Effects of external bending strain on quantum-confined Stark effects of quantum wells in wurtzite III-V nitride semiconductor heterostructures on flexible substrates," *The 49th TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, May 2015.
11. Y. Gao, M. Asadirad, P. Dutta, M. Rathi, **J.-H. Ryou**, and V. Selvamanickam, "An inexpensive approach to the solar energy by growth of flexible wafer-like GaAs and Ge thin films," *The 1st Graduate Research and Scholarship Projects (GRaSP) Day*, University of Houston, Houston, Texas, Oct. 2014.
12. M. Asadirad and **J.-H Ryou**, "Simulation and design of the flexible GaAs solar cells," *The 46th TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Dec. 2013.
13. M. Asadirad and **J.-H Ryou**, "Simulation and design of the flexible GaAs solar cells," *The 4th Annual Research Day, Research Poster Competition*, Department of Mechanical Engineering, University of Houston, Houston, Texas, Nov. 2013.

TEACHING

Teaching/Instructional Development

Undergraduate Courses Developed/Taught

- University of Houston, MECE3345 "Materials Science" (2019 Spring, 2018 Spring, 2017 Spring, and 2015 Fall).
- University of Houston, MECE3245 "Materials Science Laboratory" (2016 Fall, 2014 Fall, and 2013 Fall).
- University of Houston, MECE2336/CIVE2330-02 "Mechanics I – Statics" (2012 Fall).

Graduate Courses Developed/Taught

- University of Houston, MECE5397/6340 "Materials for Energy Storage" (2018 Fall [co-instruct with Dr. Haleh Ardebili]).
- University of Houston, MECE5397/6397 "Functional Engineering Materials, Science and Applications" (2016 Spring, online).
- University of Houston, MECE6364 "Solidification and Heat Treatments" (2014 Spring).
- University of Houston, MECE5397/MECE6397 "Special Topic: Semiconductor Materials and Photonic and Electronic Devices" (2017 Fall, 2015 Spring, and 2013 Spring).
- SungKyunKwan University, Department of Energy Science, "Semiconductor Materials and Devices for Energy Science and Applications" (2017 Winter and 2015 Winter).
- Georgia Institute of Technology, Guest lecturer for III-nitride photonics devices in ECE6542 "Optoelectronics Packaging and Systems" (Prof. G. K. Chang, 2012 Spring).
- Georgia Institute of Technology, Guest lecturer for III-nitride materials in ECE8853a "Special Topics: III-N Semiconductor Technologies" (Prof. R. D. Dupuis, 2012 Spring).
- Georgia Institute of Technology, Guest lecturer for semiconductor diode lasers and vertical-cavity surface-emitting lasers (VCSELs) in ECE6542 "Optoelectronics Packaging and Systems" (Prof. G. K. Chang, 2005 Spring, 2006 Spring, 2007 Spring).
- Georgia Institute of Technology, Guest lecturer for III-V compound semiconductor materials and devices in ECE6451 "Introduction to the Theory of Microelectronics" (Prof. S.-C. Shen, 2007 Fall).

Instructional Materials Developed

- Sustainable energy harvesting and consumption education kit.

Student Development

Undergraduate Students Advised

1. Heidi Johnson (UH, Mechanical Engineering (from Bingham Young University), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2018 – Aug. 2018.

2. Noor Nabulsi (UH, Mechanical Engineering, undergraduate research student, Provost's Undergraduate Research Scholarship (PURS) program), May 2017 – May. 2018.
3. Rebekah Blatt (UH, Mechanical Engineering (from Missouri University of Science and Technology), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2017 – Aug. 2017.
4. Yang (Colby) Huai (UH, Mechanical Engineering, undergraduate research student, Senior Honor Thesis), Sep. 2016 – Dec. 2017, Thesis: Optimization of InAlGa_N/Ga_N HEMT Device.
5. John Lee (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Sep. 2015 – Apr. 2016.
6. Mitchell Baxendale (UH, Mechanical Engineering (from Georgia Institute of Technology), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2015 – Aug. 2015.
7. Jereomy Lopez (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2015 – Jun. 2015.
8. Esther Kim (Georgia Tech, Electrical and Computer Engineering, undergraduate research assistant), 2010 – 2011.
9. Carson A. Wick (Georgia Tech, Electrical and Computer Engineering, PURA (presidential undergraduate research award) program), 2007.
10. Young Lee (Georgia Tech, Electrical and Computer Engineering, undergraduate research assistant), 2007.

Graduate Students Advised (Ph.D.)

1. Mina Moradnia (UH, Mechanical Engineering, Ph.D. course) Fall 2018 – present.
2. Jie Chen (UH, Materials Science and Engineering, Ph.D. candidate, qualifying exam passed Fall 2016), Fall 2015 – present.
3. Weijie Wang (UH, Mechanical Engineering, Ph.D. candidate, qualifying exam passed Spring 2017), Fall 2015 – present.
4. Sara Pouladi (UH, Materials Science and Engineering, Ph.D. candidate, qualifying exam passed Spring 2016), Spring 2015 – present.
5. Dr. Shahab Shervin (UH, Materials Science and Engineering, Ph.D., currently with University of Houston), Fall 2013 – Spring 2017, currently with University of Houston, Dissertation: Flexible III-Nitride-Based Materials and Devices for Electronic and Photonic Applications [***Best Dissertation Award in Materials Science and Engineering***].
6. Dr. Mojtaba Asadirad (UH, Materials Science and Engineering, Ph.D., currently with Micron Technology), Spring 2013 – Summer 2016, Dissertation: High-Performance Flexible Thin-Film Electronics Based on Single-Crystal-Like Inorganic Semiconductor Materials.

Graduate Students Advised (M.S.)

1. Yu-Li Chang (UH, Materials Science and Engineering, M.S., currently with Applied Optoelectronics Inc.), Fall 2017 – Summer 2018, Thesis: Fabrication and Properties of III-Nitride Piezoelectric Sensors.
2. Bharath Dixit (UH, Materials Science and Engineering, M.S., currently with ADVANTEST), Summer 2015 – Fall 2016.
3. Weijie Wang (UH, Mechanical Engineering, M.S., currently with University of Houston), Summer 2014 – Summer 2015, Thesis: Ga_N Characterization Using X-Ray Techniques.

Post-Doctoral Fellows Advised

1. Dr. Shivkant Dasrath Singh (UH), Oct. 2018 – present.
2. Dr. Shahab Shervin (UH), Jun. 2017 – present.
3. Dr. Mojtaba Asadirad (UH, currently with Micron Technology), Sep. 2016 – Jan. 2017.
4. Dr. Seung Kyu Oh (UH, currently with Wave Photonics Inc., Korea), May 2016 – May 2018.
5. Dr. Keon-Hwa Lee (UH, currently with Korea Photonics Technology Institute), Jan. 2015 – Jan. 2016.
6. Dr. Seunghwan Kim (UH, currently with Hongik University, Korea), May 2014 – Sep 2015.
7. Dr. Srikanth Ravipati (UH, co-advisor with Prof. Mavrokefalos, currently with University of Louisville), Feb. 2013 – Sep. 2015.
8. Dr. Hee Jin Kim (Georgia Tech, co-advisor with Prof. Dupuis, currently with Philips LumiLEDs), 2010 – 2011.

Middle- and High-School Teacher and Student Research Experience

1. Rahul Yesantharao, Senior, Clear Lake High School (summer research intern), Summer 2014.
2. Preeti Joseph, Science teacher, Straford Middle School (Research Experience for Teachers), Summer 2015.

Visiting Scholars

1. Prof. Min-Ki Kwon (Chosun University, Korea), Jul. 2018 – present.
2. Dr. Ja-Yeon Kim (Korea Photonics Technology Institute), Jul. 2018 – present.
3. Prof. Hyunsoo Kim (Chonbuk National University, Korea), Aug. 2016 – Jul. 2017.
4. Prof. Seong-Nam Lee (Korea Polytechnic University), Jan. 2015 – Jan. 2016.

Professional Service

Session Chair

1. Session 4-2: Wide Bandgap Optoelectronics, *InterPACK 2018 (2018 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems)*, San Francisco, California, Aug. 2018.
2. EEC Session: Optics/Optoelectronics, *UKC 2017 (The US-KOREA Conference on Science, Technology and Entrepreneurship 2017)*, Washington DC, Aug. 2017.
3. Session: III/V Nitride and Other WBG Semiconductors, *ACCGE-21 and OMVPE-18 (The 21st American Conference on Crystal Growth and Epitaxy and the 18th US Workshop on Organometallic Vapor Phase Epitaxy)*, Santa Fe, New Mexico, Jul.-Aug. 2017.
4. Session FF: III-Nitride Detectors, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
5. Session O: III-Nitride Defects and Characterization, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
6. Session II-B: Wide Bandgap Materials, *IUMRS-ICAM 2015 (The 14th International Union of Materials Research Societies-International Conference on Advanced Materials)*, Jeju, Korea, Oct. 2015.
7. Session MOA2: 07. Luminescence Properties, *APWS 2015 (The 7th Asia-Pacific Workshop on Widegap Semiconductors)*, Seoul, Korea, May 2015.
8. Session TB1: Nanoepitaxy for Novel LEDs II, *WLED-5 (The 5th International Conference on White LEDs and Solid State Lighting)*, Jeju, Korea, Jun. 2014.
9. Session G: Epitaxy and Characterization of InN, *ISGN-5 (The 5th International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.
10. Session A3: Optical Structure and Measurements, *ICNS-10 (The 10th International Conference on Nitride Semiconductors)*, Washington, D.C., Aug. 2013.
11. Session Q: HEMTS: Defects and Reliability, *EMC 2013 (The 55th Electronic Materials Conference)*, Norte Dame, Indiana, Jun. 2013.
12. III/V Nitride and Other Wide Bandgap Semiconductors - Session II, *ACCGE-18 and OMVPE-15 (The 18th American Conference on Crystal Growth and Epitaxy and the 15th US Biennial Workshop on Organometallic Vapor Phase Epitaxy)*, Monterey, California, Jul.-Aug. 2011.
13. Session GG: III-Nitrides: Non-Polar and Semi-Polar Devices, *EMC 2011 (The 53rd Electronic Materials Conference)*, Santa Barbara, California, Jun. 2011.
14. Session JJ: Nonpolar-Semipolar III-Ns, *EMC 2010 (The 52nd Electronic Materials Conference)*, Notre Dame, Indiana, Jun. 2010.
15. Session F: Group III Nitride Photodetectors and Photonic Lattices, *EMC 2008 (The 50th Electronic Materials Conference)*, Santa Barbara, California, Jun. 2008.
16. Session B: Microwave Devices, *ICNS-7 (The 7th International Conference on Nitride Semiconductors)*, Las Vegas, Nevada, Sep. 2007.
17. Session Q: III-Nitride MOCVD Growth, *EMC 2006 (The 48th Electronic Materials Conference)*, University Park, Pennsylvania, Jun. 2006.

Consultation

1. Applied Optoelectronics Inc., Epitaxial growth equipment and process control for semiconductor lasers, May. 2014 – Apr. 2016.
2. BioWarn LLC., Semiconductor fabrication process control for bio-sensing applications, May 2008.

Reviewer of Technical Journals

1. *ACS Applied Materials & Interfaces*, American Chemical Society (ACS)
2. *ACS Nano*, ACS
3. *ACS Photonics*, ACS
4. *AIP Advances*, American Institute of Physics (AIP)
5. *Applied Materials Today*, Elsevier
6. *Applied Optics*, Optical Society of America (OSA)
7. *Applied Physics A: Materials Science & Processing*, Springer
8. *Applied Physics B: Lasers and Optics*, Springer
9. *Applied Physics Express*, The Japan Society of Applied Physics (JSAP)
10. *Applied Physics Letters*, AIP
11. *Applied Science*, MDPI AG
12. *Applied Surface Science*, Elsevier
13. *Chemical Vapour Deposition*, Royal Society of Chemistry (RSC)
14. *Chinese Physics Letters*, Institute of Physics (IOP)
15. *Current Applied Physics*, Elsevier
16. *Crystal Growth & Design*, ACS
17. *Electrochemical and Solid-State Letters*, Electrochemical Society (ECS)
18. *Electronics*, MDPI AG
19. *ETRI Journal*, Electronics and Telecommunication Research Institute (ETRI)
20. *IEEE Electron Device Letters*, Institute of Electrical and Electronics Engineers (IEEE)
21. *IEEE Journal of Quantum Electronics*, IEEE
22. *IEEE Journal of Selected Topics in Quantum Electronics*, IEEE
23. *IEEE Photonics Technology Letters*, IEEE
24. *IEEE Photonics Journal*, IEEE
25. *IEEE Transactions on Electron Devices*, IEEE
26. *Journal of Alloys and Compounds*, Elsevier
27. *Journal of Applied Physics*, AIP
28. *Journal of Crystal Growth*, Elsevier
29. *Journal of the Electrochemical Society*, ECS
30. *Journal of Electronic Materials*, The Minerals, Metals & Materials Society (TMS)/IEEE
31. *Journal of Materials Chemistry C: Materials for Optical, Magnetic and Electronic Devices*, RSC
32. *Journal of Physics D: Applied Physics*, IOP
33. *Journal of Vacuum Science and Technology A: Vacuum, Surfaces, and Films*, The American Vacuum Society (AVS)

34. *Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures: Processing, Measurement, and Phenomena*, AVS
35. *Laser and Photonics Review*, Wiley
36. *Materials*, MDPI AG
37. *Materials Research Society Proceedings*, Materials Research Society (MRS)
38. *Materials Science and Engineering B: Advanced Functional Solid-State Materials*, Elsevier
39. *Micro & Nano Letters*, Institution of Engineering and Technology (IET)
40. *Nanoscale*, RSC
41. *Nanotechnology*, IOP
42. *Nanoscience and Nanotechnology Letters*, American Scientific Publisher (APS)
43. *Nature*, Springer Nature
44. *Nature Materials*, Springer Nature
45. *Optical and Quantum Electronics*, Springer
46. *Optics Communications*, Elsevier
47. *Optics Express*, OSA
48. *Optics and Laser Technology*, Elsevier
49. *Optics Letters*, OSA
50. *Physica Status Solidi A: Applications and Materials Science*, Wiley
51. *Physica Status Solidi B: Basic Solid State Physics*, Wiley
52. *Physica Status Solidi C: Current Topics in Solid State Physics*, Wiley
53. *Scientific Reports*, Springer Nature
54. *Semiconductor Science and Technology*, IOP
55. *Solar Energy*, Elsevier
56. *Solid State Electronics*, Elsevier

Professional Associations

- Senior Member of IEEE (The Institute of Electrical and Electronics Engineers)
 - ✓ Photonics Society (PS) and Electron Devices Society (EDS)
- Senior Member of OSA (Optical Society of America)
- Member of MRS (Materials Research Society)

Community/Public Service

Community Service

1. Judge, *MRS UH Chapter Student Symposium 2018*, University of Houston, Houston, Texas, Sep. 13, 2018.
2. Judge, *MRS UH Chapter Student Symposium 2017*, University of Houston, Houston, Texas, Apr. 5, 2017.

3. Judge, *The International Sustainable World (Energy, Engineering, and Environment) Project Olympiad 2016 (I-SWEEP-2016)*, George R. Brown Convention Center, Houston, Texas, Apr. 30, 2016.
4. Judge, *Undergraduate Research Day 2015 (UR-2015)*, Rockwell Pavilion, M.D. Anderson Library and the Honors College, University of Houston, Houston, Texas Oct. 22, 2015.
5. UH TcSUH representative, Energy Day Houston 2015, Sam Houston Park, Houston, Texas, Oct. 17, 2015.
6. Judge, *The International Sustainable World (Energy, Engineering, and Environment) Project Olympiad 2015 (I-SWEEP-2015)*, George R. Brown Convention Center, Houston, Texas, May 9, 2015.
7. UH Energy representative, Earth Day Houston 2015, Discovery Green, Apr. 11, 2015.
8. Judge, University of Houston 2014-2015 Mars Rover Celebration, Hilton University of Houston, Houston, Texas, Jan. 31, 2015.
9. UH TcSUH representative, Energy Day Houston 2014, Sam Houston Park, Houston, Texas, Oct. 18, 2014.
10. Judge, *Science and Engineering Fair of Houston (SEFH)*, George R. Brown Convention Center, Houston, Texas, Feb. 20, 2014.
11. UH TcSUH representative, Energy Day Houston 2013, Hermann Square & Tranquility Park, Houston, Texas, Oct. 19, 2013.

Outreach Programs

1. UH STEM Summer Camp, Visit to TcSUH, Jun. 24, 2014.
2. Mary Marek Elementary Visit to TcSUH/Physics, Feb. 10, 2014.
3. Young Women's College Preparatory Academy (HISD) College and Career Day, Nov. 2, 2013.

Administrative Service

Department of Mechanical Engineering, University of Houston

1. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2018.
2. Undergraduate Advisor, Fall 2018.
3. Committee Member, M.S. degree Requirement Review Committee, Aug. 2018.
4. Committee Member, Materials Group Qualifying Exam Committee, Spring 2017.