

# **Jae-Hyun Ryou, Ph.D.**

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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  
Assistant Professor Sep. 2012 – present  
Department of Mechanical Engineering, Materials Science and Engineering Program, and Texas Center for Superconductivity at the University of Houston (TcSUH)
- 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***

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## **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 (2<sup>nd</sup> term).
- Associate Editor: *Optics Express*, Optical Society of America (OSA), Nov. 2010 – Nov. 2013 (1<sup>st</sup> term).
- Guest Co-Editor: Special issue of *Physica Status Solidi C: Current Topics in Solid-State Physics, The Proceedings of the ISGN-5 (5<sup>th</sup> 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 (6<sup>th</sup> International Symposium on Growth of III-Nitrides)*, Hamamatsu, Japan, Nov. 2015.
- Co-Chair of Publications Committee, *ISGN-5 (5<sup>th</sup> International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.

## Summary

### *Publications*

Authors or coauthors (as of Feb. 15, 2018):

- 6 book chapters of books
- >175 technical published papers in refereed journals
  - ✓ Citations of >4000
  - ✓ h-index of 31
  - ✓ i10-index of 99
- >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 Jan. 31, 2018):

- 10 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\***, *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 (5<sup>th</sup> International Symposium on Growth of III-Nitrides), **12** (4-5), (2015).

### *Book Chapters*

(Since joining UH)

3. (*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 and P. Capper Ed., Wiley, Hoboken, New Jersey, U.S.A. (submitted in Sep. 2017).

4. **(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).
5. **(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)

6. **(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).
7. **(Invited book chapter) Jae-Hyun Ryou,** Ravi Kanjollila, 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).
8. **(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. 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* (submitted in Feb. 2018).
2. 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* (submitted in Feb. 2018).
3. S. M. Lee, J. H. Yum, E. S. Larsen, W. C. Lee, S. K. Kim, S. Shervin, W. Wang, **J.-H. Ryou**, C. W. Bielawski, and J.-W. Oh, "Domain matching epitaxial growth of BeO on GaN and ZnO substrates by atomic layer deposition," *Cryst. Growth Des.* (submitted in Feb. 2018).
4. **(Invited review paper) S. K. Oh**, J. Dallas, S. Shervin, D. K. Lee, S. Choi, J. S. Kwak, and **J.-H. Ryou\***, "Thermal management in high-power wide-bandgap semiconductor electronic and photonic devices," *J. Electron. Packaging* (submitted in Feb. 2018).

5. 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* (submitted in Jan. 2018).

### Accepted

6. 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* (accepted in Nov. 2017).
7. 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.* (accepted in Nov. 2017).

### Published

(Since joining UH)

8. 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).
9. 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)*]
10. 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).
11. 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).
12. 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  $3\omega$  technique," *Phys. Status Solidi A* **214** (10), 1700069-1–5 (2017). [*Featured back cover article in issue 10 of volume 214 (October, 2017)*]
13. 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).
14. M. Rathi, P. Dutta, N. Zheng, Y. Yao; D. Khaliwada, 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).
15. 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).
16. 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).

17. 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).
18. 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).
19. 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).
20. 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).
21. 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).
22. 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).
23. J.-H. Lee, S.-H. Han, K.-R. Song, **J.-H. Ryou**, H. Na, and S.-N. Lee, "Effect of SiO<sub>2</sub> hexagonal pattern on the crystal and optical properties of epitaxial lateral overgrown semipolar (11-22) GaN film," *Microelectron. Eng.* **168**, 32–36 (2017).
24. S. K. Oh, T. Jang, S. Pouladi, Y. J. Jo, H.-Y. Ko, **J.-H. Ryou\***, and J. S. Kwak, "Output power enhancement in AlGaInN/GaN heterostructure field-effect transistors with multi-level metallization," *Appl. Phys. Express* **10** (1), 016502-1–3 (2017).
25. 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).
26. S. H. Kim, K. H. Lee, H. J. Park, S. Shervin, M. Asadirad, S.-N. Lee, J. S. Kwak, and **J.-H. Ryou\***, "Patterned Ga<sub>2</sub>O<sub>3</sub> for current blocking and optical scattering in visible light-emitting diodes," *Phys. Status Solidi A* **213** (10), 2769–2772 (2016).
27. 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).
28. 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)]
29. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, S. Shervin, and **J.-H. Ryou**, "Effect of lattice-matched InAlGaIn electron-blocking layer on hole transport and distribution in InGaInN/GaN multiple quantum wells of visible light-emitting diodes," *Phys. Status Solidi A* **213** (5), 1296–1301 (2016).
30. 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).
31. 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).

32. 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)*]
33. 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).
34. 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 AlGaIn multiple-quantum wells grown on sapphire substrate," *Appl. Phys. Lett.* **107** (24), 241109-1–4 (2015).
35. 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).
36. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **J.-H. Ryou**, A. K. Sood, N. K. Dhar, and J. Lewis, "Comparison of AlGaIn p-i-n ultraviolet avalanche photodiodes grown on free-standing GaIn and sapphire substrates," *Appl. Phys. Express* **8** (12), 122202-1–4 (2015).
37. 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).
38. 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 AlGaIn-based deep-ultraviolet flip-chip light-emitting diodes: A comparison to visible flip-chip light-emitting diodes," *Opt. Express* **23** (16), 20340–20349 (2015).
39. 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] AlGaIn multiple-quantum well double-heterojunction emitters grown by metalorganic chemical vapor deposition on AlN substrates," *IEEE Photon. Technol. Lett.* **27** (16), 1768–1771 (2015).
40. 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).
41. J. Kim, M.-H. Ji, T. Detchprohm, **J.-H. Ryou**, R. D. Dupuis, A. K. Sood, and N. K. Dhar, "Al<sub>x</sub>Ga<sub>1-x</sub>N ultraviolet avalanche photodiodes with avalanche gain greater than 10<sup>5</sup> grown on GaIn substrate," *IEEE Photon. Technol. Lett.* **27** (6), 642–645 (2015).
42. 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).
43. 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 InGaIn/GaN light-emitting diodes fabricated on lens-shaped patterns," *J. Kor. Phys. Soc.* **66** (2), 266–269 (2015).
44. B. Jo, C.-R. Lee, J. S. Kim, W. S. Han, J. H. Song, **J.-H. Ryou**, J. H. Lee, and J.-Y. Leem, "High-power continuous-wave operation of InP-based InAs quantum-dot laser with dot-in-a-well structure and strain-modulating layer," *Laser Phys. Lett.* **11** (11), 115815-1–6 (2014).
45. B. Jo, C.-R. Lee, J. S. Kim, W. S. Han, J. H. Song, J.-Y. Leem, S. K. Noh, **J.-H. Ryou**, and R. D. Dupuis, "Investigation on the lasing characteristics of InAs/InGaAsP quantum dots with additional confinement structures," *J. Crystal Growth* **393**, 59–63 (2014).

46. J. Kim, M. H. Ji, D. Yuan, R. Guo, J.-P. Liu, M. Asadirad, T. Detchprohm, M.-K. Kwon, R. D. Dupuis, S. Das, and **J.-H. Ryou\***, "Direct periodic patterning of GaN-based light-emitting diodes by three-beam interference laser ablation," *Appl. Phys. Lett.* **104** (14), 1411105-1-4 (2014).
  47. J. Kim, Z. Lochner, M.-H. Ji, S. Choi, H. J. Kim, J. S. Kim, R. D. Dupuis, A. M. Fischer, R. Juday, Y. Huang, T. Li, J. Y. Huang, F. A. Ponce, and **J.-H. Ryou\***, "Origins of unintentional incorporation of gallium in InAlN layers during epitaxial growth, part II: Effects of underlying layers and growth chamber conditions," *J. Crystal Growth* **388**, 143-149 (2014).
  48. S. Choi, H. J. Kim, Z. Lochner, J. Kim, R. D. Dupuis, A. M. Fischer, R. Juday, Y. Huang, T. Li, J. Y. Huang, F. A. Ponce, and **J.-H. Ryou\***, "Origins of unintentional incorporation of gallium in AlInN layers during epitaxial growth, part I: Growth of AlInN on AlN and effects of prior coating," *J. Crystal Growth* **388**, 137-142 (2014).
  49. S. Kim, H. J. Kim, S. Choi, Z. Lochner, **J.-H. Ryou**, R. D. Dupuis, K.-S. Ahn, and H. Kim, "Electrical characteristics of Ti/Al contacts on AlInN:Mg/GaN heterostructures," *Jpn. J. Appl. Phys.* **52** (10), 10MA07-1-4 (2013).
  50. S. Kim, H. J. Kim, S. Choi, Z. Lochner, **J.-H. Ryou**, R. D. Dupuis, K.-S. Ahn, and H. Kim, "Electrical characteristics of Pt Schottky contacts on AlInN:Mg/GaN heterostructures," *Jpn. J. Appl. Phys.* **52** (10), 10MA05-1-4 (2013).
  51. Z. Lochner, X.-H. Li, T.-T. Kao, Md. M. Satter, H. J. Kim, S.-C. Shen, P. D. Yoder, **J.-H. Ryou**, R. D. Dupuis, K. W. Sun, Y. Wei, T. Li, A. M. Fischer, and F. A. Ponce, "Stimulated emission at 257 nm from optically-pumped AlGaIn/AlN heterostructure on AlN substrate," *Phys. Status Solidi A* **210** (9), 1968-1970 (2013).
  52. J. Kim, M.-H. Ji, Z. Lochner, S. Choi, J. P. Liu, Md. M. Satter, P. D. Yoder, R. D. Dupuis, R. Juday, A. M. Fischer, F. A. Ponce, and **J.-H. Ryou\***, "Improved hole transport by p-In<sub>x</sub>Ga<sub>1-x</sub>N layer in multiple quantum wells of visible LEDs," *IEEE Photon. Technol. Lett.* **25** (18), 1789-1792 (2013).
  53. R. Juday, A. M. Fischer, Y. Huang, J. Y. Huang, H. J. Kim, **J.-H. Ryou**, R. D. Dupuis, D. P. Bour, and F. A. Ponce, "Hydrogen-related, deeply-bound excitons in Mg-doped GaN films," *Appl. Phys. Lett.* **103** (8), 082103-1-5 (2013).
  54. Z. Lochner, T.-T. Kao, Y.-S. Liu, X.-H. Li, Md. M. Satter, S.-C. Shen, P. D. Yoder, **J.-H. Ryou**, R. D. Dupuis, Y. Wei, H. Xie, A. Fischer, and F. A. Ponce, "Deep-ultraviolet lasing at 243 nm from photo-pumped AlGaIn/AlN heterostructure on AlN substrate," *Appl. Phys. Lett.* **102** (10), 101110-1-4 (2013).
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## Publications (Citation)

10 selected papers with citations (as of Feb. 15, 2018 based on Google Scholar):

#	Publication	Cite	
1	<i>Journal of the American Chemical Society</i> <b>127</b> , 7920 (2005).	258	
2	<i>Advanced Materials</i> <b>22</b> , 4749 (2010).	194	
3	<i>Applied Physics Letters</i> <b>96</b> , 221105 (2010).	182	*
4	<i>IEEE Journal of Selected Topics in Quantum Electronics</i> <b>15</b> , 1080 (2009).	165	*,†,§
5	<i>Applied Physics Letters</i> <b>93</b> , 021102 (2008).	131	*
6	<i>The Journal of Physical Chemistry B</i> <b>110</b> , 7720 (2006).	123	
7	<i>Applied Physics Letters</i> <b>89</b> , 011112 (2006).	116	
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9	<i>Applied Physics Letters</i> <b>96</b> , 101102 (2010).	81	*
10	<i>Applied Physics Letters</i> <b>101</b> , 161110 (2012).	76	*

\* Corresponding author paper

† First author paper

§ Invited paper

## Publications (Peer-Reviewed Proceedings)

(Since joining UH)

1. S. K. Oh, T. Jang, Y. J. Jo, H.-Y. Ko, J. S. Kwak, and **J.-H. Ryou\***, "Comparison of multi-level metallization structure and conventional metallization structure in lateral-type AlGaIn/GaN HFETs, *Proc. 4<sup>th</sup> IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA 2016)*, 168–170 (2016).
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6. (*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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## **Conference Presentations (Peer-Reviewed Presentations)**

(Since joining UH)

1. 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.
2. W. Wang, S. K. Oh, J. Chen, S. Shervin, S. Pouladi, and **J.-H. Ryou\***, "Strain effect in flexible AlGaIn/GaN heterostructure field effect transistor and Mg-doped p-GaN," *The 60<sup>th</sup> Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.
3. S. Pouladi, M. Rathi, P. Dutta, Y. Yao, M. Asadirad, S. Shervin, J. Chen, W. Wang, V. Selvamanickam, and **J.-H. Ryou\***, "Higher efficiencies for low-cost flexible III-V solar cells directly grown on metal tapes," *The 60<sup>th</sup> Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.
4. J. Chen, S. K. Oh, N. Nabulsi, S. Shervin, W. Wang, S. Pouladi, and **J.-H. Ryou\***, "High-output lead-free flexible piezoelectric generator using single-crystalline GaN thin film," *The 60<sup>th</sup> Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.
5. S. Shervin, K. Alam, M. H. Ji, K. Shervin, S. K. Oh, T. Detchprohm, J. Bao, R. D. Dupuis, and **J.-H. Ryou\***, "Single-crystalline flexible III-N film by direct epitaxial growth on metal foil," *The 60<sup>th</sup> Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.
6. 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," *The 45<sup>th</sup> IEEE Photovoltaic Specialists Conference (PVSC-44)/The 7<sup>th</sup> World Conference on Photovoltaic Energy Conversion (WCPEC-7)*, Waikoloa, Hawaii, Jun. 2018.
7. S. Singh, S. Shervin, M. Yarali, K.-H. Li, H. Sun, R. Lin, X. Li, **J.-H. Ryou**, and A. Mavrokefalos, "Manipulating thermal transport in polycrystalline thin films by nano-texturing," *2018 Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, Apr. 2018.
8. M. Yarali, S. Pouladi, Sh. Singh, **J.-H. Ryou**, and A. Mavrokefalos, "Band Engineering for enhanced Seebeck coefficient in ultra-thin nickel silicide films," *2018 Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, Apr. 2018.
9. M. Yarali, S. Pouladi, S. Singh, **J.-H. Ryou**, and A. Mavrokefalos, "Unique semiconducting behavior of ultra-thin nickel silicide films" (B15.00013) *American Physical Society (APS) March Meeting 2018*, Los Angeles, California, Mar. 2018.
10. D. Khatiwada, P. Dutta, M. Rathi, S. Sun, Y. Yao, Y. Gao, Y. Li, S. Pouladi, **J.-H. Ryou**, and V. Selvamanickam, "Single junction GaAs thin film solar cells on flexible metal tapes for low cost

- photovoltaics" (TF-ThP33), *AVS 64th International Symposium and Exhibition (AVS 64)*, Tampa, Florida, Oct.-Nov. 2017.
11. (*Invited talk*) S. C. Shen, R. D. Dupuis, T. Detchprohm, **J.-H. Ryou**, J. B. Chaiyasarikul, M. H. Ji, T. T. Kao, Y. C. Lee, Z. Lochner, and J. Kim, "Development of III-nitride bipolar transistor switches and rectifiers," *The 232<sup>nd</sup> Electrochemical Society (ECS) Meeting: HI. State-of-the-Art Program on Compound Semiconductors 60 (SOTAPOCS 60)*, National Harbor, Maryland, Oct. 2017.
  12. **J.-H. Ryou\***, V. Selvamanickam, M. Asadirad, S. Pouladi, M. Rathi, Y. Gao, S. K. Oh, D. Khatiwada, P. Dutta, Y. Yao, S. Shervin, J. Chen, K.-H. Lee, and S.-H. Kim, "Flexible thin-film transistors and photovoltaic solar cells based on single-crystal-like semiconductors directly deposited on metal tapes" (EEC-14-2), *The 14<sup>th</sup> US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2017)*, Washington DC, Aug. 2017.
  13. (*Invited talk*) **J.-H. Ryou\***, S. Shervin, K. Alam, K. Shervin, S.-H. Kim, T. H. Chung, J. Chen, W. Wang, S. Pouladi, R. Forrest, and J. Bao, "Flexible III-N materials and devices" (EED-12-1), *The 14<sup>th</sup> US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2017)*, Washington DC, Aug. 2017.
  14. **J.-H. Ryou\***, V. Selvamanickam, S. Pouladi, M. Asadirad, M. Rathi, S. K. Oh, D. Khatiwada, P. Dutta, S. Shervin, Y. Yao, Y. Li, J. Chen, "Single-crystal-like thin film III-V materials directly grown on Hastelloy for flexible solar cells," *The 21<sup>st</sup> American Conference on Crystal Growth and Epitaxy (ACCGE-21) and the 18<sup>th</sup> US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-18)*, Santa Fe, New Mexico, Jul.-Aug. 2017.
  15. **J.-H. Ryou\***, S. Shervin, K. Alam, K. Shervin, S.-H. Kim, T. H. Chung, J. Chen, W. Wang, S. Pouladi, R. Forrest, J. Bao, "Single-crystal-like III-nitride thin films directly grown on metal tape," *The 21<sup>st</sup> American Conference on Crystal Growth and Epitaxy (ACCGE-21) and the 18<sup>th</sup> US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-18)*, Santa Fe, New Mexico, Jul.-Aug. 2017.
  16. S. K. Oh, M. U. Jo, T. Jang, J. Chen, W. Wang, S. Shervin, S. Pouladi, J. S. Kwak, and **J.-H. Ryou\***, "Suppression of self-heating effect in flexible GaN-based HFETs with metal substrates" (L3), *The 59<sup>th</sup> Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.
  17. S. Pouladi, M. Asadirad, M. Rathi, S. K. Oh, D. Khatiwada, P. Dutta, S. Shervin, Y. Yao, J. Chen, V. Selvamanickam, and **J.-H. Ryou\***, "Flexible III-V solar cells developed from single-crystal-like thin film material directly grown on Hastelloy tape" (Z8), *The 59<sup>th</sup> Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.
  18. J. Chen, S. Shervin, S. K. Oh, S. Pouladi, W. Wang, and **J.-H. Ryou\***, "AlN thin-film-based flexible piezoelectric generators" (R6), *The 59<sup>th</sup> Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.
  19. S. Shervin, K. Alam, K. Shervin, J. Chen, S.-H. Kim, T. H. Chung, S. Pouladi, R. Forrest, J. Bao, and **J.-H. Ryou\***, "Direct growth of single-crystal-like III-nitride thin films on copper foil" (CC2), *The 59<sup>th</sup> Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.
  20. Y. Li, Y. Yao, S. Song, P. Dutta, M. Rathi, **J.-H. Ryou**, and V. Selvamanickam, "Biaxial-textured titanium nitride thin films on low cost, flexible metal substrate as a conductive buffer layer for thin film solar cells," *The 44<sup>th</sup> IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017.
  21. S. Pouladi, M. Rathi, M. Asadirad, P. Dutta, S. K. Oh, D. Khatiwada, S. Shervin, Y. Yao, N. Zheng, P. Ahrenkiel, V. Selvamanickam, and **J.-H. Ryou\***, "Flexible GaAs single-junction solar cells based on single-crystal-like thin-film materials directly grown on metal tapes," *The 44<sup>th</sup> IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017. [**Best Poster Award in "Low-Cost III-V" topic area**]

22. M. Rathi, P. Dutta, D. Khatiwada, N. Zheng, Y. Yao, Y. Gao, S. Sun, Y. Li, S. Pouladi, P. Ahrenkiel, S. Reed, A. Khadimallah, **J.-H. Ryou**, and V. Selvamanickam, "Reduced defect density in single-crystalline-like GaAs thin film on flexible metal substrates by using superlattice structures," *The 44<sup>th</sup> IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017.
23. S. Pouladi, M. Asadirad, M. Rathi, P. Dutta, Y. Yao, Y. Gao, S. Shervin, S. K. Oh, V. Selvamanickam, and **J.-H. Ryou\***, "Low-cost flexible GaAs solar cells using single-crystal-like materials on metal tapes" (ES11.7.03), *2017 Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, Apr. 2017.
24. **J.-H. Ryou\***, V. Selvamanickam, M. Asadirad, Y. Gao, P. Dutta, Y. Yao, S. Shervin, and S. Pouladi, "High-performance single-crystal-like Si and Ge thin-film transistors on flexible tapes" (FA2-04), *2016 International Semiconductor Device Research Symposium (ISDRS 2016)*, Bethesda, Maryland, Dec. 2016.
25. (*Invited talk*) **J.-H. Ryou\***, S. Shervin, M. Asadirad, S. K. Oh, J. Chen, W. Wang, and S. Pouladi, "Flexible III-N heterostructures and devices for electronic and photonic applications" (WP2-04), *2016 International Semiconductor Device Research Symposium (ISDRS 2016)*, Bethesda, Maryland, Dec. 2016.
26. S. K. Oh, T. Jang, Y. J. Jo, H.-Y. Ko, J. S. Kwak, and **J.-H. Ryou\***, "Comparison of multi-level metallization structure and conventional metallization structure in lateral-type AlGaIn/GaN HFETs," *The 4<sup>th</sup> IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA 2016)*, Fayetteville, Arkansas, Nov. 2016.
27. S. Shervin, K. Alam, K. Shervin, S.-H. Kim, T. H. Chung, R. Li, J. Chen, B. Dixit, M. Asadirad, W. Wang, S. Pouladi, R. Forrest, J. Bao, and **J.-H. Ryou\***, "Direct growth of single-crystal-like III-nitride structures on metal tape for flexible wide-bandgap semiconductor devices" (D2.3.12), *International Workshop on Nitride Semiconductors (IWN 2016)*, Orlando, Florida, Oct. 2016.
28. S. Shervin, S.-H. Kim, M. Asadirad, K.-H. Lee, and **J.-H. Ryou\***, "Direct growth of single-crystal-like III-nitride structures on metal tape for flexible wide-bandgap semiconductor devices" (A2.4.04), *International Workshop on Nitride Semiconductors (IWN 2016)*, Orlando, Florida, Oct. 2016.
29. S. Shervin, S.-H. Kim, M. Asadirad, K.-H. Lee, and **J.-H. Ryou\***, "New functionalities of flexible electronic and photonic devices based on III-nitride semiconductor heterostructures" (S7:DHG2-27), *Advances in Functional Materials Conference (AFM 2016)*, Jeju, Korea, Aug. 2016.
30. S. K. Oh, T. Jang, **J.-H. Ryou**, Y. J. Jo, H.-Y. Ko, and J. S. Kwak, "Significantly enhanced output power in AlGaIn/GaN HFETs with multi-layer metallization" (PS1), *The 58<sup>th</sup> Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.
31. S. Pouladi, M. Asadirad, M. Rathi, P. Dutta, Y. Yao, Y. Gao, S. Shervin, K.-H. Lee, V. Selvamanickam, and **J.-H. Ryou\***, "Low-cost flexible GaAs solar cells using single-crystal-like materials on metal tapes" (Q3), *The 58<sup>th</sup> Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.
32. S. Shervin, S.-H. Kim, M. Asadirad, K.-H. Lee, and **J.-H. Ryou\***, "Strain effect transistors: Theoretical study on the effect of external bending on III-nitride-based flexible high electron mobility transistors"(PS3), *The 58<sup>th</sup> Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.
33. M. Asadirad, Y. Gao, P. Dutta, Y. Yao, S. Shervin, S. Pouladi, K.-H. Lee, S.-H. Kim, V. Selvamanickam, and **J.-H. Ryou\***, "High-performance thin-film transistors based on single-crystal-like Si and Ge epitaxially grown on metal and flexible glass tapes" (E4), *The 58<sup>th</sup> Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.

34. M. Asadirad, M. Rathi, S. Pouladi, Y. Yao, P. Dutta, S. Shervin, K. H. Lee, N. Zheng, P. Ahrenkiel, V. Selvamanickam, and **J.-H. Ryou\***, "III-V thin-film photovoltaic solar cells based on single-crystal-like GaAs grown on flexible metal tapes," *The 43<sup>rd</sup> IEEE Photovoltaic Specialists Conference (PVSC-43)*, Portland, Oregon, Jun. 2016.
35. M. Rathi, P. Dutta, N. Zheng, Y. Yao, Y. Gao, S. Sun, A. Khadimallah, M. Thomas, M. Asadirad, P. Ahrenkiel, **J.-H. Ryou**, and V. Selvamanickam, "AlGaAs/GaAs DH and InGaP/GaAs DH grown by MOCVD on flexible metal substrates," *The 43<sup>rd</sup> IEEE Photovoltaic Specialists Conference (PVSC-43)*, Portland, Oregon, Jun. 2016.
36. X. Li, H. Xie, F. Ponce, **J.-H. Ryou**, T. Detchprohm, and R. D. Dupuis, "Onset of deep UV surface stimulated emission from AlGaIn multiple quantum wells"(JThA2.45), *Conference on Lasers and Electro-Optics: Applications and Technology 2016 (CLEO 2016)*, San Jose, California, Jun. 2016.
37. Y. Gao, M. Asadirad, P. Dutta, S. Sun, Y. Yao, M. Rathi, Y. Li, **J.-H. Ryou**, and V. Selvamanickam, "Highly efficient and economical flexible thin film transistors based on high mobility single-crystalline-like Si by PECVD" (EP.4.11.19), *2016 Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, Mar.-Apr. 2016.
38. Y. Gao, P. Dutta, M. Rathi, M. Asadirad, S. Sun, Y. Yao, Y. Li, **J.-H. Ryou**, and V. Selvamanickam, "Achieving highly efficient and economical flexible photovoltaics with roll-to-roll epitaxial thin film deposition technology" (NN19.02), *2015 Materials Research Society (MRS) Fall Meeting*, Boston, Massachusetts, Nov.-Dec. 2015.
39. (*Invited talk*) **J.-H. Ryou\***, S. Shervin, S.-H. Kim, M. Asadirad, S. Yu. Karpov, and D. Zimina, "Polarization engineering of wide-bandgap III-nitride semiconductor materials and devices" (II-2Tu4B3-1), *The 14<sup>th</sup> International Union of Materials Research Societies-International Conference on Advanced Materials (IUMRS-ICAM 2015)*, Jeju, Korea, Oct. 2015.
40. (*Invited talk*) **J.-H. Ryou\***, S. Shervin, S. H. Kim, and M. Asadirad, "Multifunctional flexible III-N light-emitting diodes" (S6E-O012), *XXIV International Materials Research Congress (IMRC 2015)*, Cancun, Mexico, Aug. 2015.
41. K. H. Lee, S. H. Kim, and **J.-H. Ryou\***, "GaN-based light-emitting diodes with thin-film-flip-chip-based wafer-level chip-scale package technology using anisotropic conductive film bonding" (MSE-4), *The 12<sup>th</sup> US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2015)*, Atlanta, Georgia, Jul.-Aug. 2015.
42. S. Shervin, S. H. Kim, M. Asadirad, and **J.-H. Ryou\***, "Internal quantum efficiency improvement and peak emission wavelength tuning in flexible visible GaN-based light-emitting diodes" (MSE-12), *The 12<sup>th</sup> US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2015)*, Atlanta, Georgia, Jul.-Aug. 2015.
43. M. Asadirad, Y. Gao, S. H. Kim, S. Shervin, P. Dutta, V. Selvamanickam, and **J.-H. Ryou\***, "Thin-film transistors based on single-crystal-like germanium grown on flexible metal tapes" (Z4), *The 57<sup>th</sup> Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.
44. S. Shervin, S. H. Kim, M. Asadirad, and **J.-H. Ryou\***, "Polarization engineering in InGaIn/GaN flexible light-emitting diodes: internal quantum efficiency improvement and peak emission wavelength tuning" (Q9), *The 57<sup>th</sup> Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.
45. S. H. Kim, S. Shervin, M. Asadirad, V. Venkateswaran, K. Olenick, J. A. Olenick and **J.-H. Ryou\***, "GaN-based light-emitting diode on flexible ceramic substrate" (Q7), *The 57<sup>th</sup> Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.
46. V. Selvamanickam, P. Dutta, M. Rathi, Y. Yao, Y. Gao, N. Zheng, P. Ahrenkiel, and **J.-H. Ryou**, "Thin film III-V photovoltaics using single-crystalline-like, flexible substrates" (R26-254), *The 42<sup>nd</sup> IEEE Photovoltaic Specialists Conference (PVSC-42)*, New Orleans, Louisiana, Jun. 2015.



47. (*Invited talk*) **J.-H. Ryou\***, "Epitaxial growth, characterization, and devices of InAlN materials" (MOA1-1), *The 7<sup>th</sup> Asia-Pacific Workshop on Widegap Semiconductors (APWS 2015)*, Seoul, Korea, May 2015.
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250. **J.-H. Ryou**, J.-H. Jun, Y. K. Lee, and C. S. Choi, "Effect of deformation degree on damping capacity and hardness of an austenitic stainless steel," *The 2<sup>nd</sup> Pacific Rim International Conference on Materials (PRICM-2)*, Kyungjoo, Korea, Jun. 1995.

## R&D Projects and Grants (As PI or co-PI)

### *Principal Investigator (PI)*

1. 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)).
2. Development of epitaxial structure design and growth technology of semiconductor lasers (PI, Jun. 2017 – Dec. 2017, UH, LG Innotek).
3. X-ray diffraction analysis of semiconductor superlattice structures (PI, Nov. 2016 – Jan. 2017, UH, Applied Optoelectronics).
4. Analysis of amorphous carbon films on TEOS/Si substrates (PI, Nov. 2016 – Dec. 2016, UH, TEL Technology Center America).
5. 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)).
6. 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.).
7. 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)).
8. Epitaxial structure development for III-nitride-based Schottky junction power devices (PI, 2008 – 2009, Georgia Tech, Alpha and Omega Semiconductors).
9. Advanced HFET devices and circuits for high-performance, high-reliability RF devices (PI, 2004 – 2005, Georgia Tech, DARPA, subcontract from Magellus Corp.).
10. Development of commercial 650nm red VCSEL (PI, 2001 – 2003, Honeywell Technology Center).

### ***Co-Principal Investigator (Co-PI)***

11. Investigation of controlled bending strain in deep UV LED efficiency (co-PI, Apr. 2017 – Mar. 2021, KAUST).
12. Physical property measurement system (co-PI, Aug. 2015 – Aug. 2016, DURIP Program, ONR).
13. High efficiency, inexpensive thin film III-V photovoltaics using single-crystalline-like, flexible substrates (co-PI, Oct. 2014 – Sep. 2018, UH, Next Generation Photovoltaic Technologies III Program, DoE - EERE).
14. Advanced Middle-UV coherent optical sources (co-PI, 2010 – 2012, Georgia Tech, CMUVT program, DARPA).
15. Fundamental study of defect reduction in type-II superlattice materials (co-PI, 2010 – 2012, Georgia Tech, ARO MURI).
16. Collaborative Research: Nanobeam lasers (co-PI, 2010 – 2012, Georgia Tech, NSF-EPDT/ECCS).
17. Growth and development of high performance UV imaging focal plane arrays (co-PI, 2010 – 2014, Georgia Tech, DARPA SBIR, subcontract from Magnolia Optical Technologies).
18. Development of nitride electronic next generation technology (co-PI, 2010 – 2012, Georgia Tech, NeXT program, DARPA, subcontract from HRL).
19. E-mode III-nitride high-voltage transistor development (co-PI, 2009 – 2012, Georgia Tech, Intersil Corporation).
20. Development of high-voltage GaN-based DC-DC converter for radio isotope micro-power sources (co-PI, 2009 – 2010, Georgia Tech, RIMS program, DARPA, subcontract from Trace Photonics).
21. MOCVD growth of advanced III-N HFETs on bulk GaN substrates (co-PI, 2009 – 2010, Georgia Tech, AFRL, subcontract from Kyma Technologies).
22. Fundamental studies and development of III-N visible light emitting diodes for high-power solid-state lighting applications (co-PI, 2008 – 2011, Georgia Tech, National Energy Technology Laboratory (NETL), Solid State Lighting Core Technologies, DoE).
23. Novel high-performance III-N HBTs for next-generation energy-efficiency systems (co-PI, 2007 – 2011, Georgia Tech, NSF-EPDT/ECCS).
24. Development of high-efficiency InGaN-based green lasers (co-PI, 2007 – 2010, Georgia Tech, VIGIL program, DARPA).
25. Development of advanced deep-UV Geiger-mode avalanche photodiodes arrays for critical sensing applications (co-PI, 2006 – 2008, Georgia Tech, DUVAP program, DARPA).

### **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/US20147/050844; 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** and **J.-H. Ryou**, "Bio-compatible flexible III-N thin-film piezoelectric generators," *The 54<sup>th</sup> TcSUH Semiannual Student Symposium*, University of Houston, Houston, Texas, Dec. 2017.
2. **S. Pouladi** and **J.-H. Ryou**, "Next-generation solar cells," *The 3<sup>rd</sup> Annual Graduate Research and Scholarship Projects (GRASP) Day*, University of Houston, Houston, Texas, Nov. 2017.
3. **S. Pouladi** and **J.-H. Ryou**, "Flexible III-V photovoltaics based on single-crystal-like materials grown on low-cost metal tape," *The 53<sup>rd</sup> 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)*].
4. **S. Pouladi**, **M. Rathi**, **M. Asadirad**, **V. Selvamanickam**, and **J.-H. Ryou**, "III-V thin-film photovoltaic solar cells on flexible metal tapes," *The 1<sup>st</sup> UH-MRS Chapter Student Symposium*, University of Houston, Houston, Texas, Apr. 2017.
5. **S. Shervin** and **J.-H. Ryou**, "Direct growth of single-crystal-like III-nitride materials on metal tapes for flexible electronics and photonics," *The 52<sup>nd</sup> 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)*].

6. S. Pouladi and **J.-H. Ryou**, "Flexible GaAs solar cells bases on single-crystal-like materials on low-cost tapes," *The 51<sup>st</sup> TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2016.
7. 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 50<sup>th</sup> TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Dec. 2015.
8. 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 2<sup>nd</sup> Graduate Research and Scholarship Projects (GRaSP) Day*, University of Houston, Houston, Texas, Oct. 2015.
9. 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 49<sup>th</sup> TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, May 2015.
10. 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 1<sup>st</sup> Graduate Research and Scholarship Projects (GRaSP) Day*, University of Houston, Houston, Texas, Oct. 2014.
11. M. Asadirad and **J.-H Ryou**, "Simulation and design of the flexible GaAs solar cells," *The 46<sup>th</sup> TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Dec. 2013.
12. M. Asadirad and **J.-H Ryou**, "Simulation and design of the flexible GaAs solar cells," *The 4<sup>th</sup> Annual Research Day, Research Poster Competition*, Department of Mechanical Engineering, University of Houston, Houston, Texas, Nov. 2013.

# ***TEACHING***

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## **Teaching/Instructional Development**

### ***Undergraduate Courses Developed/Taught***

- University of Houston, MECE3345 "Materials Science" (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, MECE5397/6397 "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. Noor Nabulsi (UH, Mechanical Engineering, undergraduate research student), May 2017 – present.
2. 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.
3. Yang (Colby) Huai (UH, Mechanical Engineering, undergraduate research student, Senior Honor Thesis), Sep. 2016 – Dec. 2017, Thesis: Optimization of InAlGa<sub>N</sub>/Ga<sub>N</sub> HEMT Device.



4. John Lee (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Sep. 2015 – Apr. 2016.
5. Mitchell Baxendale (UH, Mechanical Engineering (from Georgia Institute of Technology), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2015 – Aug. 2015.
6. Jereomy Lopez (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2015 – Jun. 2015.
7. Esther Kim (Georgia Tech, Electrical and Computer Engineering, undergraduate research assistant), 2010 – 2011.
8. Carson A. Wick (Georgia Tech, Electrical and Computer Engineering, PURA (presidential undergraduate research award) program), 2007.
9. Young Lee (Georgia Tech, Electrical and Computer Engineering, undergraduate research assistant), 2007.

#### ***Graduate Students Advised (Ph.D.)***

1. Jie Chen (UH, Materials Science and Engineering, Ph.D. candidate, qualifying exam passed Fall 2016), Fall 2015 – present.
2. Weijie Wang (UH, Mechanical Engineering, Ph.D. candidate, qualifying exam passed Spring 2017), Fall 2015 – present.
3. Sara Pouladi (UH, Materials Science and Engineering, Ph.D. candidate, qualifying exam passed Spring 2016), Spring 2015 – present.
4. Dr. Shahab Shervin (UH, Materials Science and Engineering, Ph.D., Fall 2013 – Spring 2017, currently with University of Houston, Thesis: Flexible III-Nitride-Based Materials and Devices for Electronic and Photonic Applications [*Best Dissertation Award in Materials Science and Engineering*]).
5. Dr. Mojtaba Asadirad (UH, Materials Science and Engineering, Ph.D., currently with Micron Technology), Spring 2013 – Summer 2016, Thesis: 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. candidate), Fall 2017 – present.
2. Harshvardhan Dixit (UH, co-advisor with Prof. Bose, Mechanical Engineering, M.S. candidate), Fall 2017 – present.
3. Bharath Dixit (UH, Materials Science and Engineering, M.S., currently with KLA Tencor), Summer 2015 – Fall 2016.
4. Weijie Wang (UH, Mechanical Engineering, M.S., currently with University of Houston), Summer 2014 – Summer 2015, Thesis: GaN Characterization Using X-Ray Techniques.
5. Michael Naquib (UH, Materials Science and Engineering, M.S.), Spring 2014 – present.

#### ***Post-Doctoral Fellows Advised***

1. Dr. Shahab Shervin (UH), Jun. 2016 – present.
2. Dr. Mojtaba Asadirad (UH, currently with Micron Technology), Sep. 2016 – Jan. 2017.
3. Dr. Seung Kyu Oh (UH), May 2016 – present.
4. Dr. Keon-Hwa Lee (UH, currently with LG Innotek), Jan. 2015 – Jan. 2016.

5. Dr. Seunghwan Kim (UH, currently with Hongik University, Korea), May 2014 – Sep 2015.
6. Dr. Srikanth Ravipati (UH, co-advisor with Prof. Mavrokefalos, currently with University of Louisville), Feb. 2013 – Sep. 2015.
7. 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, Sttraford Middle School (Research Experience for Teachers), Summer 2015.

## Professional Service

### *Session Chair*

1. EEC Session: Optics/optoelectronics, *UKC 2017 (The US-KOREA Conference on Science, Technology and Entrepreneurship 2017)*, Washington DC, Aug. 2017.
2. Session: III/V Nitride and Other WBG Semiconductors, *ACCGE-21 and OMVPE-18 (The 21<sup>st</sup> American Conference on Crystal Growth and Epitaxy and the 18<sup>th</sup> US Workshop on Organometallic Vapor Phase Epitaxy)*, Santa Fe, New Mexico, Jul.-Aug. 2017.
3. Session FF: III-Nitride Detectors, *EMC 2016 (The 58<sup>th</sup> Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
4. Session O: III-Nitride Defects and Characterization, *EMC 2016 (The 58<sup>th</sup> Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
5. Session II-B: Wide Bandgap Materials, *IUMRS-ICAM 2015 (The 14<sup>th</sup> International Union of Materials Research Societies-International Conference on Advanced Materials)*, Jeju, Korea, Oct. 2015.
6. Session MOA2: 07. Luminescence Properties, *APWS 2015 (The 7<sup>th</sup> Asia-Pacific Workshop on Widegap Semiconductors)*, Seoul, Korea, May 2015.
7. Session TB1: Nanoepitaxy for Novel LEDs II, *WLED-5 (The 5<sup>th</sup> International Conference on White LEDs and Solid State Lighting)*, Jeju, Korea, Jun. 2014.
8. Session G: Epitaxy and Characterization of InN, *ISGN-5 (The 5<sup>th</sup> International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.
9. Session A3: Optical Structure and Measurements, *ICNS-10 (The 10<sup>th</sup> International Conference on Nitride Semiconductors)*, Washington, D.C., Aug. 2013.
10. Session Q: HEMTS: Defects and Reliability, *EMC 2013 (The 55<sup>th</sup> Electronic Materials Conference)*, Norte Dame, Indiana, Jun. 2013.
11. III/V Nitride and Other Wide Bandgap Semiconductors - Session II, *ACCGE-18 and OMVPE-15 (The 18<sup>th</sup> American Conference on Crystal Growth and Epitaxy and the 15<sup>th</sup> US Biennial Workshop on Organometallic Vapor Phase Epitaxy)*, Monterey, California, Jul.-Aug. 2011.
12. Session GG: III-Nitrides: Non-Polar and Semi-Polar Devices, *EMC 2011 (The 53<sup>rd</sup> Electronic Materials Conference)*, Santa Barbara, California, Jun. 2011.
13. Session JJ: Nonpolar-Semipolar III-Ns, *EMC 2010 (The 52<sup>nd</sup> Electronic Materials Conference)*, Notre Dame, Indiana, Jun. 2010.
14. Session F: Group III Nitride Photodetectors and Photonic Lattices, *EMC 2008 (The 50<sup>th</sup> Electronic Materials Conference)*, Santa Barbara, California, Jun. 2008.
15. Session B: Microwave Devices, *ICNS-7 (The 7<sup>th</sup> International Conference on Nitride Semiconductors)*, Las Vegas, Nevada, Sep. 2007.
16. Session Q: III-Nitride MOCVD Growth, *EMC 2006 (The 48<sup>th</sup> 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 Surface Science*, Elsevier
12. *Chemical Vapour Deposition*, Royal Society of Chemistry (RSC)
13. *Chinese Physics Letters*, Institute of Physics (IOP)
14. *Current Applied Physics*, Elsevier
15. *Crystal Growth & Design*, ACS
16. *Electrochemical and Solid-State Letters*, Electrochemical Society (ECS)
17. *Electronics*, MDPI AG
18. *ETRI Journal*, Electronics and Telecommunication Research Institute (ETRI)
19. *IEEE Electron Device Letters*, Institute of Electrical and Electronics Engineers (IEEE)
20. *IEEE Journal of Quantum Electronics*, IEEE
21. *IEEE Journal of Selected Topics in Quantum Electronics*, IEEE
22. *IEEE Photonics Technology Letters*, IEEE
23. *IEEE Photonics Journal*, IEEE
24. *IEEE Transactions on Electron Devices*, IEEE
25. *Journal of Alloys and Compounds*, Elsevier
26. *Journal of Applied Physics*, AIP
27. *Journal of Crystal Growth*, Elsevier
28. *Journal of the Electrochemical Society*, ECS
29. *Journal of Electronic Materials*, The Minerals, Metals & Materials Society (TMS)/IEEE
30. *Journal of Materials Chemistry C: Materials for Optical, Magnetic and Electronic Devices*, RSC
31. *Journal of Physics D: Applied Physics*, IOP
32. *Journal of Vacuum Science and Technology A: Vacuum, Surfaces, and Films*, The American Vacuum Society (AVS)
33. *Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures: Processing, Measurement, and Phenomena*, AVS

34. *Laser and Photonics Review*, Wiley
35. *Materials*, MDPI AG
36. *Materials Research Society Proceedings*, Materials Research Society (MRS)
37. *Materials Science and Engineering B: Advanced Functional Solid-State Materials*, Elsevier
38. *Micro & Nano Letters*, Institution of Engineering and Technology (IET)
39. *Nanoscale*, RSC
40. *Nanotechnology*, IOP
41. *Nanoscience and Nanotechnology Letters*, American Scientific Publisher (APS)
42. *Nature Materials*, Nature Publishing Group (NPG)
43. *Optical and Quantum Electronics*, Springer
44. *Optics Express*, OSA
45. *Optics and Laser Technology*, Elsevier
46. *Optics Letters*, OSA
47. *Physica Status Solidi A: Applications and Materials Science*, Wiley
48. *Physica Status Solidi B: Basic Solid State Physics*, Wiley
49. *Physica Status Solidi C: Current Topics in Solid State Physics*, Wiley
50. *Scientific Reports*, NPG
51. *Solar Energy*, Elsevier
52. *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 2017*, University of Houston, Houston, Texas, Apr. 5, 2017.
2. 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.
3. 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.
4. UH TcSUH representative, *Energy Day Houston 2015*, Sam Houston Park, Houston, Texas, Oct. 17, 2015.

5. 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.
6. UH Energy representative, Earth Day Houston 2015, Discovery Green, Apr. 11, 2015.
7. Judge, University of Houston 2014-2015 Mars Rover Celebration, Hilton University of Houston, Houston, Texas, Jan. 31, 2015.
8. UH TcSUH representative, Energy Day Houston 2014, Sam Houston Park, Houston, Texas, Oct. 18, 2014.
9. Judge, *Science and Engineering Fair of Houston (SEFH)*, George R. Brown Convention Center, Houston, Texas, Feb. 20, 2014.
10. 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.