**Jae-Hyun (Jae) Ryou**, Ph.D.

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Cullen College of Engineering, University of Houston
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# Education

| | |
|---|---|
| Ph.D. | Materials Science and Engineering, **University of Texas at Austin**, 2001 |
| Area | Solid-State Electronic Materials (Advisor: Dr. Russell D. Dupuis) |
| Dissertation | 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 Experience

**University of Houston**, Houston, Texas
- Associate Professor — Sep. 2018 – present
- Assistant Professor — Sep. 2012 – Aug. 2018
  - Department of Mechanical and Aerospace Engineering
  - Department of Electrical and Computer Engineering (joint appointment)
  - Materials Science and Engineering Program (joint appointment)
  - Texas Center for Superconductivity at the University of Houston (TcSUH)
  - Advanced Manufacturing Institute (AMI)

**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

## Awards and Honors

- **Air Force Summer Faculty Fellowship**, Air Force Office of Scientific Research, Jun. 2025
- **Awards for Excellence in Research, Scholarship and Creative Activity**, University of Houston, April 2024.
  - ✓ This award is the highest award to recognize excellent research and scholarly activity at the University of Houston
- **50-in-5 Scholars** in 2022, University of Houston, 2022
  - ✓ Given to faculty members who authored high-impact journal articles
- **Air Force Summer Faculty Fellowship**, Air Force Office of Scientific Research, Jun. 2023
- **Air Force Summer Faculty Fellowship**, Air Force Office of Scientific Research, Jun. 2022
- **W. T. Kittinger Teaching Excellence Award**, University of Houston Cullen College of Engineering, May 2022
  - ✓ The W.T. Kittinger Teaching Excellence Award is traditionally one of the highest teaching awards given at the Cullen College. This award recognizes outstanding teaching and service to students
- **50-in-5 Scholars** in 2020-2021, University of Houston, 2021
  - ✓ Given to faculty members who were granted US patents
- **50-in-5 Scholars** in 2020, University of Houston, 2020
  - ✓ Given to faculty members who authored high-impact journal articles
- **Rising Innovator Award**, University of Houston Cullen College of Engineering, Jun. 2020
  - ✓ The Rising Innovator Award recognizes efforts by tenured associate faculty in innovation and entrepreneurship at UH who have demonstrated a track record of mentorship in addition to clear efforts in transferring technology to practice
- **50-in-5 Scholars** in 2019-2020, University of Houston, 2020
  - ✓ Given to faculty members who were granted US patents
- **50-in-5 Scholars** in 2019, University of Houston, 2019
  - ✓ Given to faculty members who authored high-impact journal articles
- **Senior Faculty Research Excellence Award**, University of Houston Cullen College of Engineering, Apr. 2019
  - ✓ The Research Excellence Award recognizes faculty for their outstanding research contributions. This award is recognized at both the junior and senior levels
- **Outstanding Reviewer Award** in 2018, Acta Materialia, Mar. 2019

- **50-in-5 Scholars** in 2018, University of Houston, 2018
  - ✓ Given to faculty members who authored high-impact journal articles
- **Teaching Excellence Award**, University of Houston Cullen College of Engineering, May 2017
  - ✓ The Teaching Excellence Award recognizes outstanding teaching and service to students
- **Roger P. Webb Research Spotlight Award**, Georgia Institute of Technology School of Electrical and Computer Engineering, Apr. 2011
- **Korean Government Overseas Scholarship**, Oct. 1995
- **POSCO Research Paper Award**, Jan. 1995
- **Daewoo Engineering Fellowship**, Mar. 1994

# Professional Activities/Service

## *Editor of Books and Journals*

- **Guest Co-Editor**: *Nanomaterials*, Special Issue: III-N Based Semiconductor Nanomaterials for Photonic and Electronic Devices, MDPI, Jul. 2022.
- **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 Organizing Committee**, *Electronic Materials Conference (EMC)*, 2021 – present.
- **Member of Committee**, Subcommittee: Power and Energy Devices, *EDTM 2023 (7th IEEE Electron Devices Technology and Manufacturing Conference)*, Seoul, Korea, Mar. 2023.
- **Member of Invited Organizers**, *EMC 2021 (63rd Electronic Materials Conference)*, Virtual Conference, Jun. 2021.
- **Member of Invited Organizers**, *EMC 2020 (62nd Electronic Materials Conference)*, Columbus, Ohio, Jun. 2020.

- **Member of Program Committee**, *ICCGE 19/OMVPE 19 (19th International Conference on Crystal Growth and Epitaxy/19th US Biennial Workshop on Organometallic Vapor Phase Epitaxy)*, Keystone, Colorado, Jul.-Aug. 2019.
- **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 April 1, 2025):

- 6 book chapters of books
- >210 technical published papers in refereed journals
  - ✓ Citations of ~8,000
  - ✓ h-index of 44
  - ✓ i10-index of 170
- ~300 contributed/invited presentations in technical conferences
  - ✓ >10 invited presentations in international conferences
- 12 US patents granted
- ~70 invited seminar presentations in academic institutions/industry/national labs

## Research Projects

Leads research activities (as of April 1 2025):

- 24 sponsored research projects as a PI
- 21 sponsored research projects as a Co-PI

# Selected Notable Publications

## Books

1. *Flexible Devices Based on III-V Semiconductors - Applications in Electronics, Photonics and Energy*, Springer International Publishing AG, Cham, Switzerland (in preparation, production planned in 2025). **[Invited single-author book]**

## Featured Articles and/or Papers in High-Impact Journals

2. "Skin-attached piezoelectric sensor arrays for continuous monitoring of oculomotor movements," ***Adv. Healthc. Mater.*** 13, 2303581 (2024). **[Featured frontispiece article, IF: 10.0, Corresponding author]**
3. "Piezoelectric sensor operating at very high temperatures and in extreme environments made of flexible ultrawide-bandgap single-crystalline AlN thin films,"

***Adv. Funct. Mater.*** 33, 2212538 (2023). **[Featured front-cover article, IF: 19.92, Corresponding author]**

4. "All-around diamond for cooling high-power devices," ***Nat. Electron.*** 5, 834 (2022). **[IF: 33.255, Frist and corresponding author]**
5. "Thermodynamic analysis of hybrid chemical vapor deposition of transition-metal-alloyed group-III-nitride ScAlN piezoelectric semiconductor films," ***Cryst. Growth Des.*** 22, 2239 (2022). **[Featured supplementary-cover article, Corresponding author]**.
6. "Flexible single-crystalline GaN substrate by direct deposition of III-N thin films on polycrystalline metal tape," ***J. Mater. Chem. C*** 9, 2243 (2021). **[Featured front-cover article, Corresponding author]**
7. "Highly-sensitive skin-attachable self-powered eye-movement sensor using flexible non-hazardous piezoelectric thin film," ***Adv. Funct. Mater.*** 31, 2008242 **[IF: 16.836, Corresponding author]**
8. "Modulation of the 2-dimensional electron gas channel in flexible AlGaN/GaN high-electron-mobility transistors by mechanical bending," ***Appl. Phys. Lett.*** 116, 123501 (2020). **[Featured editor's pick article, Corresponding author]**
9. "High durable, biocompatible and flexible piezoelectric pulse sensor using III-N thin film," ***Adv. Funct. Mater.*** 29, 1903162 (2019). **[Featured back-cover article, IF: 16.836, Corresponding author]**
10. "Polarization modulation effect of BeO on AlGaN/GaN high-electron-mobility transistors," ***Appl. Phys. Lett.*** 115, 103502 (2019). **[Featured editor's pick article, Corresponding author]**
11. "Thermal management and characterization of high-power wide-bandgap semiconductor electronic and photonic devices in automotive applications," ***J. Electron. Packaging*** 141, 020801 (2019). **[Invited review article, Corresponding author]**
12. "Flexible GaAs solar cells on roll-to-roll processed epitaxial Ge films on metal foils: a route towards low-cost and high-performance III-V photovoltaics," ***Energy Environ. Sci.*** 12, 756 (2019). **[IF: 33.250]**
13. "Biocompatible and sustainable power supply for self-powered wearable and implantable electronics using flexible III-nitride thin-film-based piezoelectric generator," ***Nano Energy*** 57, 670 (2019). **[IF: 15.548, Corresponding author]**
14. "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.*** 27, 30 (2019). **[Featured cover article, Corresponding author]**
15. "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, 1700571 (2018). **[Featured cover article]**

16. "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, 1700637 (2018). **[IF: 15.84]**

17. "New insight into Ni-rich layered structure for next-generation Li rechargeable batteries," ***Adv. Energy Mater.*** 8, 1701788 (2018). **[Featured front-cover article, IF: 25.245]**

18. "Temperature-dependent thermal conductivity of flexible yttria-stabilized zirconia substrate via 3ω technique," ***Phys. Status Solidi A*** 214, 1700069 (2017). **[Featured back-cover article]**

19. "High-performance flexible thin-film transistors based on single-crystal-like germanium on glass," ***Adv. Electron. Mater.*** 2, 1600041 (2016). **[Featured frontispiece article, Corresponding author]**

20. "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, 486 (2016). **[Featured cover article, Corresponding author]**

21. "Temperature-dependent resonance energy transfer from semiconductor quantum wells to graphene," ***Nano Lett.*** 15, 896 (2015). **[IF: 11.238]**

22. "Ordered nanowire array blue/near-UV light emitting diodes," ***Adv. Mater.*** 22, 4749 (2010). **[IF: 27.398]**

23. "Control of quantum confined Stark effect in InGaN-based quantum wells," ***IEEE J. Select. Topic. Quantum Electron.*** 15, 1080 (2009). **[Invited article, First and corresponding author]**

24. "Growth of uniformly aligned ZnO nanowire heterojunction arrays on GaN, AlN, and $Al_{0.5}Ga_{0.5}N$ substrates," ***J. Am. Chem. Soc.*** 127, 7920 (2005). **[IF: 14.612]**

# Books and Book Chapters

* Corresponding/leading author

## *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 (production planned in 2025).

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*

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 and P. Capper, 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).
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).

# Journal Papers (Peer Reviewed)

* Corresponding author
Underlined for student advised at UH
Dotted-underlined for post-doctoral fellow advised at UH

## *Submitted*

1. N.-I. Kim, J. Chen, J. Wosik, M. S. Villagran, H. M. Lee, G. Seo, J. Roh, M. Moradnia, S. Pouladi, M. Yarali, M.-K. Kwon, J.-Y. Kim, and **J.-H. Ryou***, "Single-crystalline III-N thin-film based high-sensitive, biocompatible, and skin-attachable piezoelectric cortisol sensor," *Nat. Electron.* (to be submitted).

2. N.-I. Kim, J. Lee, G. Seo, H. M. Lee, M. Aqib, S. Pouladi, J.-Y. Kim, M.-K. Kwon, J. Rho, and **J.-H. Ryou***, "Skin-attachable piezoelectric tape sensors for rehabilitation of stroke patients," *Adv. Healthc. Mater.* (to be submitted).
3. N.-I. Kim, J. Lee, M. Aqib, S. Pouladi, A. Ali, H. Ardebili, S. Park, J. Seok, W. S. Yoon, and **J.-H. Ryou***, "Flexible III-N thin-film piezoelectric sensor for smart lithium-ion battery management system," *ACS Sensor.* (to be submitted).

## *Accepted*

4.

## *Published*

1. S. Park, J. Seok, W. Lee, S. Lee, S. Lee, H. Mun, H. J. Chung, N.-I. Kim, **J.-H. Ryou**, and W.-S. Yoon, "Structural stabilization of 4.6 V $LiCoO_2$ through tri-site co-doping with Al-Mg-F," *Small* **21** (5), 2409892-1–11 (2025).
2. S. Pouladi, Y. G. Kim, N.-I. Kim, A. Ali, J. Kim, Y. Choi, K.-H. Lee, and **J.-H. Ryou***, "Inverted junction VCSEL arrays operating at 940 nm with >5 W employing tunnel junction," *IEEE Photon Technol. Lett.* **36** (23), 1369–1372 (2024).
3. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, R. P. Rajesh Kumar, N.-I. Kim, G. A. Garrett, A. V. Sampath, R. Forrest, and **J.-H. Ryou***, "Crack-free >1-μm AlN layer on Si substrate using ductile interlayer for strain modification in epitaxial film," *Appl. Phys. Lett.* **125** (11), 112104-1–6 (2024).
4. N.-I. Kim, J. Chen, W. Wang, M. Moradnia, S. Pouladi, J.-Y. Kim, M.-K. Kwon, and **J.-H. Ryou***, "Skin-attached piezoelectric sensor arrays for continuous monitoring of oculomotor movements," *Adv. Healthc. Mater.* **13** (15), 2303581-1–11 (2024). **[Featured frontispiece article, in issue 15 of volume 13 (Jun. 2024)]**
5. Y. G. Kim, S. Pouladi, N.-I. Kim, M. Moradnia, J. Kim, K.-H. Lee, and **J.-H. Ryou***, "Inverted n-p junction 940-nm VCSEL arrays consisting of 875 devices on p-GaAs substrate," *Electron. Lett.* **60** (9), e13166-1–3 (2024).
6. M. Aqib, S. Pouladi, M. Moradnia, R. P. Rajesh Kumar, N.-I. Kim, and **J.-H. Ryou***, "Strain accumulation and relaxation on crack formation in epitaxial AlN film on Si (111) substrate," *Appl. Phys. Lett.* **124** (4), 042109-1–6 (2024).
7. N.-I. Kim, M. Yarali, M. Aqib, M. Moradnia, C.-H. Liao, F. AlQatari, M. Nong, X. Li, and **J.-H. Ryou***, "Piezoelectric sensor operating at very high temperatures and in extreme environments made of flexible ultrawide-bandgap single-crystalline AlN thin films," *Adv. Funct. Mater.* **33**, 2212538-1–10 (2023). **[Featured front-cover article, in issue 10 of volume 33 (March 2023)]**
8. **J.-H. Ryou*** and S. Choi, "All-around diamond for cooling high-power devices," *Nat. Electron.* **5**, 834–835 (2022).

9. M. Moradnia, S. Pouladi, M. Aqib, and **J.-H. Ryou***, "Thermodynamic analysis of Group-III-nitride alloying with yttrium by hybrid chemical vapor deposition," *Nanomater.* **12**, 4053-1–15 (2022).

10. N.-I. Kim, J. M. Lee, M. Moradnia, J. Chen, S. Pouladi, M. Yarali, J. Y. Kim, M.-K. Kwon, T. R. Lee, and **J.-H. Ryou***, "Biocompatible composite thin-film wearable piezoelectric pressure sensor for monitoring of physiological and muscle motions," *Soft Sci.* **2**, 8-1–12 (2022).

11. S. Pouladi, C. Favela, W. Wang, M. Moradnia, S. Shervin, N.-I. Kim, J. Chen, S. Sharma, G. Yang, M.-C. Nguyen, R. Choi, J. Kim, A. Fedorenko, B. Bogner, J. Bao, S. Hubbard, V. Selvamanickam, and **J.-H. Ryou***, "Significant improvement of conversion efficiency by passivation of low-angle grain boundaries in flexible low-cost single-crystal-like GaAs thin-film solar cells directly deposited on metal tape," *Sol. Energy Mater. Sol. Cells* **243**, 111791-1–9 (2022).

12. M. Moradnia, S. Pouladi, J. Chen, N.-I. Kim, O. Aigbe, and **J.-H. Ryou***, "Thermodynamic analysis of hybrid chemical vapor deposition of transition-metal-alloyed group-III-nitride ScAlN piezoelectric semiconductor films," *Cryst. Growth Des.* **22** (4), 2239−2247 (2022). **[Featured supplementary-cover article in issue 5 of volume 22 (April 2022)] [Also Featured in a special issue of Women Researchers at the Forefront of Crystal Engineering]**

13. J.-Y. Kim, G.-G. Oh, E. Kim, H.-S. Kim, G. Hong, **J.-H. Ryou**, and M.-K. Kwon, "Silver-nanowire-based localized-surface-plasmon-assisted transparent conducting electrode for high-efficiency light-emitting diode," *Appl. Sci.* **11**, 7747-1–9 (2021).

14. S. Shervin, M. Moradnia, K. Alam, T. Tang, M.-H. Ji, J. Chen, S. Pouladi, T. Detchprohm, R. Forrest, J. Bao, R. D. Dupuis, and **J.-H. Ryou***, "Flexible single-crystalline GaN substrate by direct deposition of III-N thin films on polycrystalline metal tape," *J. Mater. Chem. C* **9** (7), 2243−2251 (2021). **[Featured front-cover article in issue 7 of volume 9 (February 2021)]**

15. W. Gu, Y. Lu, R. Lin, W. Guo, Z.-H. Zhang, **J.-H. Ryou**, J. Yan, J. Wang, J. Li, and X. Li, "BAlN for III-nitride UV light emitting diodes: Undoped electron blocking layer," *J. Phys. D: Appl. Phys.* **54** (17), 175104-1−9 (2021).

16. N.-I. Kim, J. Chen, W. Wang, M. Moradnia, S. Pouladi, J. Y. Kim, M.-K. Kwon, X. Li, and **J.-H. Ryou***, "Highly-sensitive skin-attachable self-powered eye-movement sensor using flexible non-hazardous piezoelectric thin film," *Adv. Funct. Mater.* **31** (8), 2008242-1−11 (2021).

17. D. Khatiwada, C. A. Favela, S. Sun, C. Zhang, S. Sharma, M. Rathi, P. Dutta, E. Galstyan, A. Belianinov, A. V. Ievlev, S. Pouladi, A. Fedorenko, **J.-H. Ryou**, S. Hubbard, and V. Selvamanickam, "High-efficiency single-junction p-i-n GaAs solar cell on roll-to-roll epi-ready flexible metal foils for low-cost photovoltaics," *Prog. Photovoltaics: Res. Appl.* **28** (11), 1107−1119 (2020).

18. Y. Song, J. S. Lundh, W. Wang, J. Leach, D. Eichfeld, A. Krishnan, C. Perez, D. Ji, T. Borman, K. Ferri, J.-P. Maria, S. Chowdhury, **J.-H. Ryou**, B. Foley, and S. Choi, "The doping dependence of the thermal conductivity of bulk gallium nitride substrates," *J. Electron. Packaging* **142** (4), 041112-1−10 (2020).

19. J.-Y. Kim, Y.-H. Cho, H.-S. Park, T.-H. Chung, S. Bang, A. Lee, M. S. Jeong, **J.-H. Ryou**, and M.-K. Kwon, "Localized surface plasmon-enhanced transparent conducting electrode for high-efficiency light emitting diode," *Mater. Lett.* **271**, 127790-1–4 (2020).

20. N.-I. Kim, Y.-L. Chang, J. Chen, T. Barbee, W. Wang, J. Y. Kim, M.-K. Kwon, S. Shervin, M. Moradnia, S. Pouladi, D. Khatiwada, V. Selvamanickam, and **J.-H. Ryou***, "Piezoelectric pressure sensor based on flexible gallium nitride thin film for harsh-environment and high-temperature applications," *Sensor. Actuat. A - Phys.* **305**, 111940-1–9 (2020).

21. W. H. Kim, Y. J. Jang, M. Kang, J.-Y. Kim, M. Han, K. Yang, **J.-H. Ryou**, and M.-K. Kwon, "High-performance color-converted full-color micro-LED arrays," *Appl. Sci.* **10** (6), 2112-1–7 (2020).

22. W. Wang, J. Chen, J. S. Lundh, S. Shervin, S. K. Oh, S. Pouladi, Z. Rao, J. Y. Kim, M.-K. Kwon, X. Li, S. Choi, and **J.-H. Ryou***, "Modulation of the 2-dimensional electron gas channel in flexible AlGaN/GaN high-electron-mobility transistors by mechanical bending," *Appl. Phys. Lett.* **116** (12), 123501-1–5 (2020). **[Featured editor's pick article in issue 12 of volume 116 (March 2020)]**

23. J.-Y. Kim, Y.-H. Cho, H.-S. Park, **J.-H. Ryou**, and M.-K. Kwon, "Mass transfer of microscale light-emitting diodes to unusual substrates by spontaneously formed vertical tethers during chemical lift-off," *Appl. Sci.* **9** (20), 4243-1–8 (2019).

24. J. Chen, H. Liu, W. Wang, N. Nabulsi, W. Zhao, J. Y. Kim, M.-K. Kwon, and **J.-H. Ryou***, "High durable, biocompatible and flexible piezoelectric pulse sensor using III-N thin film," *Adv. Funct. Mater.* **29** (37), 1903162-1–10 (2019). **[Featured back-cover article in issue 37 of volume 29 (September 2019)]**

25. J. Chen, N. Nabulsi, W. Wang, J. Y. Kim, M.-K. Kwon, and **J.-H. Ryou***, "Output characteristics of thin-film flexible piezoelectric generators: A numerical and experimental investigations," *Appl. Energy* **255**, 113856-1–12 (2019).

26. W. Wang, S. M. Lee, S. Pouladi, J. Chen, S. Shervin, S. Yoon, J. H. Yum, E. S. Larsen, C. W. Bielawski, B. Chatterjee, S. Choi, J. Oh, and **J.-H. Ryou***, "Polarization modulation effect of BeO on AlGaN/GaN high-electron-mobility transistors," *Appl. Phys. Lett.* **115** (10), 103502-1–5 (2019). **[Featured editor's pick article in issue 10 of volume 115 (September 2019)]**

27. 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 single-crystalline-like materials on low-cost, flexible metal tapes through growth of a silver thin film," *J. Appl. Cryst.* **52** (4), 898–902 (2019).

28. D. Khatiwada, M. Rathi, P. Dutta, S. Sicong, C. Favela, 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," *ACS Appl. Energy Mater.* **2** (5), 3114–3119 (2019).

29. 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* **199**, 122–128 (2019).

30. S. M. Lee, J. H. Yum, E. S. Larsen, S. Shervin, W. Wang, **J.-H. Ryou**, C. W. Bielawski, W. C. Lee, S. K. Kim, and J. Oh, "Domain epitaxy of crystalline BeO films on GaN and ZnO substrates," *J. Am. Ceram. Soc.* **102** (6), 3745–3752 (2019).

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## Conference Presentations (Peer Reviewed)

1. ***(Invited talk)*** **J.-H. Ryou***, N.-I. Kim, A. Ali, M. Aqib, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, L. S. Larkin, and, "Ultrawide-bandgap AlN thin-film piezoelectric physical sensors for high-temperature and harsh-environment applications," *The 2025 Lester Eastman Conference on High Performance Devices (LEC 2025)*, Gainesville, Florida, Aug. 2025.

2. A. Ali, N.-I. Kim, and **J.-H. Ryou***, "Acoustic wireless power transfer system for integrated healthcare devices based on biocompatible III-N piezoelectric materials," *The 67th Electronic Materials Conference (EMC 2025)*, Durham, North Carolina, Jun. 2025.

3. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, N.-I. Kim, G. A. Garrett, A. V. Sampath, and **J.-H. Ryou***, "Crack-free single-crystalline AlN thick film on Si (111) substrates using ductile buffer layers of Au and Zr," *The 67th Electronic Materials Conference (EMC 2025)*, Durham, North Carolina, Jun. 2025.

4. S. Pouladi, Y. G. Lee, K. H. Lee, and **J.-H. Ryou***, "Large-area inverted n-p junction vertical-cavity surface-emitting laser arrays on n-GaAs substrate employing tunnel junction," *The 67th Electronic Materials Conference (EMC 2025)*, Durham, North Carolina, Jun. 2025.

5. N.-I. Kim, M. Aqib, M. H. Ji, A. Ali, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, J. D. Demaree, L. S. Larkin, A. V. Sampath, and **J.-H. Ryou***, "Effect of harsh environments on single-crystalline AlN and GaN thin-film piezoelectric sensors," *The 67th Electronic Materials Conference (EMC 2025)*, Durham, North Carolina, Jun. 2025.

6. N.-I. Kim and **J.-H. Ryou***, "Swelling monitoring of commercial lithium-ion batteries using flexible piezoelectric sensors," *The 67th Electronic Materials Conference (EMC 2025)*, Durham, North Carolina, Jun. 2025.

7. S. Pouladi, Y. G. Lee, N.-I. Kim, A. Ali, J. Kim, Y. Choi, K. H. Lee, and **J.-H. Ryou***, "Inverted-junction vertical-cavity surface-emitting laser arrays for sensing applications," *The Compound Semiconductor Week 2025 (CSW 2025)*, Banff, Alberta, Canada, May 2025.

8. N.-I. Kim, A. Ali, M. Aqib, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, J. D. Demaree, L. S. Larkin, A. V. Sampath, and **J.-H. Ryou***, "Ultrawide-bandgap AlN thin-film piezoelectric pressure sensors operating at ~1000 °C," *The Compound Semiconductor Week 2025 (CSW 2025)*, Banff, Alberta, Canada, May 2025.

9. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, N.-I. Kim, G. A. Garrett, A. V. Sampath, R. Forrest, and **J.-H. Ryou***, "Crack-free thick AlN film on Si substrates for large-area ultrawide-bandgap semiconductor and piezoelectric resonator applications," *The Compound Semiconductor Week 2025 (CSW 2025)*, Banff, Alberta, Canada, May 2025.

10. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, N.-I. Kim, G. A. Garrett, A. V. Sampath, R. Forrest, and **J.-H. Ryou***, "Crack-free AlN thin films on Si substrates for large-area ultrawide-bandgap semiconductor template" (submitted), *The 2025 International Conference on Compound Semiconductor Manufacturing Technology (CS-MANTECH 2025)*, New Orleans, Louisiana, May 2025.

11. ***(Invited keynote talk)*** **J.-H. Ryou***, "Emerging ultrawide-bandgap semiconductor for electronics, photonics, energy, and sensing," *The 1st JBNU G-LAMP Annual International Forum*, Jeonju, South Korea, Feb. 2025.

12. N.-I. Kim, and **J.-H. Ryou***, "Wearable non-invasive cortisol sensors from sweat," *The 2024 KSEA West Gulf Coast Regional Conference (WGCRC 2024)*, Houston, Texas, Dec. 2024.

13. N.-I. Kim, and **J.-H. Ryou***, "Flexible, biocompatible, and wearable eye movement sensors for brain disorder clinical studies," *The 2024 KSEA West Gulf Coast Regional Conference (WGCRC 2024)*, Houston, Texas, Dec. 2024.

14. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, N.-I. Kim, R. P. R. Kumar, G. A. Garrett, A. V. Sampath, R. Forrest, and **J.-H. Ryou***,

"Epitaxial growth of crack-free thick AlN film on Si substrate using ductile interlayers," *The 12th International Workshop on Nitride Semiconductors (IWN 2024)*, O'ahu, Hawaii, Nov. 2024.

15. N.-I. Kim, A. Ali, M. Aqib, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, L. S. Larkin, and **J.-H. Ryou***, "Ultrawide-bandgap AlN and wide-bandgap GaN thin-film piezoelectric physical sensors for harsh environment applications," *The 12th International Workshop on Nitride Semiconductors (IWN 2024)*, O'ahu, Hawaii, Nov. 2024.

16. N.-I. Kim, A. Ali, S. Pouladi, and **J.-H. Ryou***, "Skin-attachable III-N physical sensors for personal healthcare monitoring applications," *The 12th International Workshop on Nitride Semiconductors (IWN 2024)*, O'ahu, Hawaii, Nov. 2024.

17. N.-I. Kim, J. Lee, G. Seo, H. M. Lee, A. Ali, J. Roh, and **J.-H. Ryou***, "Piezoelectric flexible pressure sensor array with single-crystalline III-N thin film for practical rehabilitation by detection of muscle motions," *The 66th Electronic Materials Conference (EMC 2024)*, College Park, Maryland, Jun. 2024.

18. N.-I. Kim, J. Lee, A. Ali, and **J.-H. Ryou***, "Skin-attachable piezoelectric III-N thin-film sensors for continuous monitoring of cortisol and glucose levels from sweat," *The 66th Electronic Materials Conference (EMC 2024)*, College Park, Maryland, Jun. 2024.

19. M. Aqib, S. Pouladi, M. Moradnia, R. P. R. Kumar, N.-I. Kim, and **J.-H. Ryou***, "Strain accumulation and relaxation on crack formation in epitaxial AlN films on Si (111) substrate," *The 66th Electronic Materials Conference (EMC 2024)*, College Park, Maryland, Jun. 2024.

20. N.-I. Kim, A. Ali, M. Aqib, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, and **J.-H. Ryou***, "Effects of radiation and operating temperature in GaN and AlN thin-film piezoelectric sensors for harsh environment applications," *The 66th Electronic Materials Conference (EMC 2024)*, College Park, Maryland, Jun. 2024.

21. M. Aqib, M. Moradnia, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, S. Pouladi, N.-I. Kim, G. A. Garrett, A. V. Sampath, R. Forrest, and **J.-H. Ryou***, "Crack-free AlN film exceeding 1-μm thickness epitaxially grown on Si substrate," *The 66th Electronic Materials Conference (EMC 2024)*, College Park, Maryland, Jun. 2024.

22. ***(Invited talk)*** N.-I. Kim and **J.-H. Ryou***, "Stable and sensitive physical piezoelectric sensors operating in extreme environments," *Unconventional Resources Technology Conference (URTeC 2024)*, Houston, Texas, Jun. 2024.

23. N.-I. Kim, A. Ali, and **J.-H. Ryou***, "Skin-attachable microbalance using flexible GaN thin film for stress hormone monitoring from sweat" (TuP-ED-26), *The 14th International Conference on Nitride Semiconductors (ICNS-14)*, Fukuoka, Japan, Nov. 2023.

24. N.-I. Kim, M. Aqib, M. Yarali, and **J.-H. Ryou***, "Single-crystalline AlN thin-film piezoelectric sensors operating at 900 °C and in extreme environments" (ED15-2), *The 14th International Conference on Nitride Semiconductors (ICNS-14)*, Fukuoka, Japan, Nov. 2023.

25. M. Aqib, M. Moradnia, S. Pouladi, and **J.-H. Ryou***, "Strain accumulation and relaxation in AlN film on Si (111) substrate: A consideration on crack formation in epitaxial growth of ultrawide-bandgap semiconductor films," *The 23rd American Conference on Crystal Growth and Epitaxy (ACCGE-23)/the 21st US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-21)*, Tucson, Arizona, Aug. 2023.

26. N.-I. Kim, M. Aqib, M. Yarali, and **J.-H. Ryou***, "Single-crystalline layer-transferred III-N films for flexible piezoelectric sensors in extreme environment applications," *The 23rd American Conference on Crystal Growth and Epitaxy (ACCGE-23)/the 21st US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-21)*, Tucson, Arizona, Aug. 2023.

27. N.-I. Kim, A. Ali, and **J.-H. Ryou***, "Piezoelectric single-crystalline flexible GaN thin film for stress hormone detection from sweat," *The 23rd American Conference on Crystal Growth and Epitaxy (ACCGE-23)/the 21st US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-21)*, Tucson, Arizona, Aug. 2023.

28. ***(Invited talk)*** **J.-H. Ryou***, "New device applications of III-nitride wide-bandgap semiconductors: Beyond power electronics and visible/UV photonics," *The 14th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2023)*, Dallas, Texas, Aug. 2023.

29. M. Moradnia, S. Pouladi, M. Aqib, and **J.-H. Ryou***, "Crack-free III-N epitaxial growth on Si (111) substrate exceeding 1 μm in thickness" (G05), *The 65th Electronic Materials Conference (EMC 2023)*, Santa Barbara, California, Jun. 2023.

30. M. Moradnia, S. Pouladi, and **J.-H. Ryou***, "Composition control of ternary Group-IIIa-IIIb-Nitride alloy by hybrid chemical vapor deposition of: A thermodynamic analysis" (R05), *The 65th Electronic Materials Conference (EMC 2023)*, Santa Barbara, California, Jun. 2023.

31. N.-I. Kim, M. Yarali, M. Aqib, and **J.-H. Ryou***, "Piezoelectric sensing in extreme environments using flexible ultrawide bandgap III-N thin films" (U09), *The 65th Electronic Materials Conference (EMC 2023)*, Santa Barbara, California, Jun. 2023.

32. N.-I. Kim, A. Ali, and **J.-H. Ryou***, "Highly sensitive and selective cortisol detection from sweat using piezoelectric single-crystalline flexible GaN thin-film sensor" (II05), *The 65th Electronic Materials Conference (EMC 2023)*, Santa Barbara, California, Jun. 2023.

33. ***(Invited talk)*** N.-I. Kim, and **J.-H. Ryou***, "III-N thin-film-based highly accurate flexible piezoelectric sensor for high-temperature applications," *The Compound Semiconductor Week 2023 (CSW 2023)*, Jeju, Korea, May-Jun. 2023.

34. S. Pouladi and **J.-H. Ryou***, "Effect of parasitic leakage currents associated with the regrown aperture of AlGaN/GaN current aperture vertical electron transistors (CAVETs)," *The 7th IEEE Electron Devices Technology and Manufacturing (IEEE EDTM 2023)*, Seoul, Korea, Mar. 2023.

35. N.-I. Kim, M. Yarali, M. Aqib, and **J.-H. Ryou***, "Highly flexible piezoelectric pressure sensor at extremely high-temperature range using ultrawide-bandgap III-N

thin films," *The 7th IEEE Electron Devices Technology and Manufacturing (IEEE EDTM 2023)*, Seoul, Korea, Mar. 2023.

36. N.-I. Kim, J. Chen, M. Moradnia, S. Pouladi, and **J.-H. Ryou***, "Wearable eye movement sensors using flexible and biocompatible III-N thin films for personal safety, healthcare monitoring, and abnormality diagnosis" (C06), *The 64th Electronic Materials Conference (EMC 2022)*, Columbus, Ohio, Jun. 2022.

37. N.-I. Kim, J. Chen, M. Aqib, and **J.-H. Ryou***, "Pressure monitoring at extremely high-temperature range using highly flexible piezoelectric sensor made of ultrawide bandgap III-N thin films" (C03), *The 64th Electronic Materials Conference (EMC 2022)*, Columbus, Ohio, Jun. 2022.

38. N.-I. Kim, J. Chen, and **J.-H. Ryou***, "Stress hormone detection by skin-attachable sensor using single-crystalline III-N piezoelectric thin film" (C01), *The 64th Electronic Materials Conference (EMC 2022)*, Columbus, Ohio, Jun. 2022.

39. M. Moradnia, S. Pouladi, N.-I. Kim, and **J.-H. Ryou***, "Transition-metal-alloyed group-III-nitride piezoelectric thin films grown by hybrid chemical vapor deposition and sputtering deposition techniques" (W03), *The 64th Electronic Materials Conference (EMC 2022)*, Columbus, Ohio, Jun. 2022.

40. M. Yarali, S. Pouladi, N.-I. Kim, J. Y. Kim, M.-K. Kwon, X. Li, and **J.-H. Ryou***, "Significant improvement in quantum efficiencies and wall-plug efficiency of flexible deep-ultraviolet light-emitting diodes" (V04), *The 64th Electronic Materials Conference (EMC 2022)*, Columbus, Ohio, Jun. 2022.

41. S. Pouladi, M. Moradnia, K. Le, N.-I. Kim, M. Yarali, S. Sharma, C. Favela, V. Selvamanickam, and **J.-H. Ryou***, "Single-crystal-like GaAs thin films passivated by hydrogen and sulfur for significant improvement of conversion efficiency of flexible III-V solar cells," *The 22nd American Conference on Crystal Growth and Epitaxy (ACCGE-22)/the 20th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-20)*, Virtual conference, Aug. 2021.

42. M. Moradnia, J. Chen, S. Pouladi, N.-I. Kim, and **J.-H. Ryou***, "Thermodynamic analysis of hybrid vapor phase epitaxy (HybVPE) of $Al_{1-x}Sc_xN$ single-crystalline piezoelectric thin films," *The 22nd American Conference on Crystal Growth and Epitaxy (ACCGE-22)/the 20th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-20)*, Virtual conference, Aug. 2021.

43. N.-I. Kim, J. Chen, M. Moradnia, S. Pouladi, and **J.-H. Ryou***, "Flexible single-crystalline III-N thin films for physical sensors of personal healthcare and safety monitoring and medical diagnosis," *The 22nd American Conference on Crystal Growth and Epitaxy (ACCGE-22)/the 20th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-20)*, Virtual conference, Aug. 2021.

44. S. Pouladi, S. Sharma, M. Moradnia, O. Stefanov, K. Le, C. Favela, V. Selvamanickam, and **J.-H. Ryou***, "Effect of low-angle grain-boundary passivation in flexible single-crystal-like thin-film GaAs solar cells," *The 48th IEEE Photovoltaic Specialists Conference (PVSC-48)*, Miami-Fort Lauderdale, Florida, Jun. 2021. **[Best Poster Award in "Low-Cost, High-Performance III-V Solar Cells" topic area]**

45. M. Moradnia, J. Chen, S. Pouladi, N.-I. Kim, and **J.-H. Ryou***, "Hybrid vapor phase epitaxy of transition-metal-alloyed single-crystalline wide-bandgap piezoelectric semiconductor films" (OO03), *The 63rd Electronic Materials Conference (EMC 2021)*, Virtual conference, Jun. 2021.

46. N.-I. Kim, J. Chen, M. Moradnia, S. Pouladi, and **J.-H. Ryou***, "Skin-attachable physical sensors using single-crystalline III-N piezoelectric thin film for personal health and safety monitoring" (JJ04), *The 63rd Electronic Materials Conference (EMC 2021)*, Virtual conference, Jun. 2021.

47. S. Pouladi, S. Sharma, N.-I. Kim, M. Moradnia, C. Favela, V. Selvamanickam, and **J.-H. Ryou***, "Sulfur passivation effect on low-angle grain boundaries in single-crystal-like GaAs flexible thin-film solar cells on metal tape" (Z01), *The 63rd Electronic Materials Conference (EMC 2021)*, Virtual conference, Jun. 2021.

48. W. Wang, S. Pouladi, S. M. Lee, J. S. Lundh, J. H. Um, J. Chen, S. Shervin, J. Oh, S. Choi, and **J.-H. Ryou***, "Active polarization engineering in AlGaN/GaN high-electron-mobility transistors to modulate 2-dimensional electron gas density by piezoelectric cap layer and external bending strain" (Y03), *The 62nd Electronic Materials Conference (EMC 2020)*, Columbus, Ohio, Jun. 2020.

49. N.-I. Kim, J. Chen, W. Wang, and **J.-H. Ryou***, "Single-crystalline III-N thin-film piezoelectric sensors for various applications" (RR04), *The 62nd Electronic Materials Conference (EMC 2020)*, Columbus, Ohio, Jun. 2020.

50. S. Pouladi, C. Favela, M. Rathi, S. Shervin, J. Chen, W. Wang, V. Selvamanickam, and **J.-H. Ryou***, "Passivation of low-angle grain boundaries in single-crystal-like GaAs flexible thin-film solar cells on metal tape for significant improvement of conversion efficiency" (U05), *The 62nd Electronic Materials Conference (EMC 2020)*, Columbus, Ohio, Jun. 2020.

51. Y. Song, B. Chatterjee, W. Wang, J. Leach, S. Chowdhury, B. Foley, **J.-H. Ryou**, and S. Choi, "The doping dependence of the thermal conductivity of bulk gallium nitride synthesized via diverse growth techniques" (6538), *2019 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, San Francisco, California, Oct. 2019.

52. V. Selvamanickam, D. Khatiwada, P. Dutta, C. Favela, M. Rathi, C. Zhang, S. Pouladi, and **J.-H. Ryou**, "Thin film GaAs devices on epi-ready metal substrates for flexible photovoltaics and flexible electronics," *2019 IEEE International Flexible Electronics Technology Conference (IFETC 2019)*, Vancouver, Canada, Aug. 2019.

53. S. Pouladi, M. Rathi, D. Khatiwada, P. Dutta, S. Shervin, J. Chen, W. Wang, V. Selvamanickam, and **J.-H. Ryou***, "Single-crystal-like GaAs thin-film solar cells directly on flexible metal tapes," *The 19th International Conference on Crystal Growth and Epitaxy (ICCGE-19)/the 19th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-19)*, Keystone, Colorado, Jul. 2019.

54. S. Shervin, K. Alam, M.-H. Ji, K. Shervin, S. K. Oh, T. Detchprohm, J. Bao, R. D. Dupuis, and **J.-H. Ryou***, "Transfer-free flexible single-crystalline III-N film directly grown on metal tape for bendable inorganic photonic and electronic devices," *The 19th International Conference on Crystal Growth and Epitaxy (ICCGE-19)/the 19th*

*US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-19)*, Keystone, Colorado, Jul. 2019.

55. J. Chen, N. Nabulsi, W. Wang, H. Johnson, S. K. Oh, S. Shervin, S. Pouladi, and **J.-H. Ryou***, "Single-crystalline III-N thin films for flexible piezoelectric generators and pulse sensors" (MP3.2), *The 19th International Conference on Crystal Growth and Epitaxy (ICCGE-19)/the 19th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-19)*, Keystone, Colorado, Jul. 2019.

56. J. Chen, N. Nabulsi, W. Wang, H. Johnson, S. K. Oh, H. Liu, S. Shervin, S. Pouladi, and **J.-H. Ryou***, "Flexible piezoelectric generators and pulse sensors using single-crystalline III-N thin film" (D01.03), *The 13th International Conference on Nitride Semiconductors (ICNS 13)*, Bellevue, Washington, Jul. 2019.

57. S. Shervin, K. Alam, M.-H. Ji, K. Shervin, S. K. Oh, T. Detchprohm, J. Bao, R. D. Dupuis, and **J.-H. Ryou***, "Flexible metal foil substrate with transfer-free epitaxially grown single-crystalline III-N film for bendable inorganic photonic and electronic devices" (D01.05), *The 13th International Conference on Nitride Semiconductors (ICNS 13)*, Bellevue, Washington, Jul. 2019.

58. ***(Invited talk)*** **J.-H. Ryou***, S. Shervin, J. Chen, W. Wang, S. K. Oh, Sh. D. Singh, S. Pouladi, M. Moradnia, M.-K. Kwon, J. Y. Kim, N. Nabulsi, and H. Johnson, "Flexible multifunctional III-N semiconductor materials and devices for energy applications," *2019 Asia-Pacific Workshop on Fundamentals and Applications of Advanced Semiconductor Devices (AWAD 2019)*, Busan, Korea, Jul. 2019.

59. J. Chen, N. Nabulsi, W. Wang, H. Johnson, S. K. Oh, H. Liu, W. Zhao, S. Shervin, S. Pouladi, and **J.-H. Ryou***, "Single-crystalline III-N thin film-based flexible piezoelectric generators and pulse sensors" (E01), *The 61st Electronic Materials Conference (EMC 2019)*, Ann Arbor, Michigan, Jun. 2019.

60. S. Pouladi, M. Rathi, P. Dutta, S. Shervin, J. Chen, W. Wang, V. Selvamanickam, and **J.-H. Ryou***, "Effects of low-angle grain boundaries on conversion efficiencies of single-crystal-like GaAs thin-film solar cells on flexible metal tapes" (PS40), *The 61st Electronic Materials Conference (EMC 2019)*, Ann Arbor, Michigan, Jun. 2019.

61. W. Wang, S. Pouladi, S. M. Lee, J. H. Um, J. Chen, S. Shervin, J. Oh, and **J.-H. Ryou***, "Polarization modulation effect of BeO on AlGaN/GaN high-electron-mobility transistors" (F02), *The 61st Electronic Materials Conference (EMC 2019)*, Ann Arbor, Michigan, Jun. 2019.

62. ***(Invited talk)*** **J.-H. Ryou***, S. Shervin, J. Chen, W. Wang, S. K. Oh, Sh. D. Singh, S. Pouladi, M. Moradnia, M.-K. Kwon, J. Y. Kim, N. Nabulsi, and H. Johnson, "Flexible multifunctional III-N semiconductor materials and devices for energy applications" (H01-1285), *The 235th Electrochemical Society (ECS) Meeting: H1. Wide Bandgap Semiconductor Materials and Devices 20*, Dallas, Texas, May 2019.

63. J. Chen, S. K. Oh, N. Nabulsi, S. Shervin, W. Wang, S. Pouladi, H. Johnson, and **J.-H. Ryou***, "Bio-compatible high-output flexible III-N thin film piezoelectric generator" (ED14-5), *International Workshop on Nitride Semiconductors (IWN 2018)*, Kanazawa, Japan, Nov. 2018.

64. 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.

65. J. S. Lundh, S. K. Oh, J. S. Kwak, **J.-H. Ryou**, and S. Choi, "Thermal characteristics of high-power flexible AlGaN/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.

66. W. Wang, S. K. Oh, J. Chen, S. Shervin, S. Pouladi, and **J.-H. Ryou***, "Strain effect in flexible AlGaN/GaN heterostructure field effect transistor and Mg-doped p-GaN" (DD03), *The 60th Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.

67. 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" (JJ04), *The 60th Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.

68. 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" (JJ08), *The 60th Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.

69. 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 substrate for bendable photonic and electronic devices" (Q03), *The 60th Electronic Materials Conference (EMC 2018)*, Santa Barbara, California, Jun. 2018.

70. 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 45th IEEE Photovoltaic Specialists Conference (PVSC-45)/The 7th World Conference on Photovoltaic Energy Conversion (WCPEC-7)*, Waikoloa, Hawaii, Jun. 2018.

71. M. Rathi, D. Khatiwada, P. Dutta, C. Favela, Y. Yao, S. Sun, S. Pouladi, P. Ahrenkiel, **J.-H. Ryou**, V. Selvamanickam, "2-J GaAs Solar Cells on Epi-Ready Flexible Metal Substrates," *The 45th IEEE Photovoltaic Specialists Conference (PVSC-45)/The 7th World Conference on Photovoltaic Energy Conversion (WCPEC-7)*, Waikoloa, Hawaii, Jun. 2018.

72. D. Khatiwada, P. Dutta, M. Rathi, B. Yu, C. Favela, Y. Yao, S. Sun, Y. Li, S. Pouladi, **J.-H. Ryou**, V. Selvamanickam, "Impact of passivation on base thickness for single junction flexible GaAs solar cells on epi-ready metal tape," *The 45th IEEE Photovoltaic Specialists Conference (PVSC-45)/The 7th World Conference on Photovoltaic Energy Conversion (WCPEC-7)*, Waikoloa, Hawaii, Jun. 2018.

73. 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.

74. 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.

75. ***(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 232nd Electrochemical Society (ECS) Meeting: H1. State-of-the-Art Program on Compound Semiconductors 60 (SOTAPOCS 60)*, National Harbor, Maryland, Oct. 2017.

76. **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 14th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2017)*, Washington DC, Aug. 2017.

77. ***(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 14th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2017)*, Washington DC, Aug. 2017.

78. **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 21st American Conference on Crystal Growth and Epitaxy (ACCGE-21)* and *the 18th US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-18)*, Santa Fe, New Mexico, Jul.-Aug. 2017.

79. **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 21st American Conference on Crystal Growth and Epitaxy (ACCGE-21)* and *the 18th US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-18)*, Santa Fe, New Mexico, Jul.-Aug. 2017.

80. 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 59th Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.

81. 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 59th Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.

82. J. Chen, S. Shervin, S. K. Oh, S. Pouladi, W. Wang, and **J.-H. Ryou***, "AlN thin-film-based flexible piezoelectric generators" (R6), *The 59th Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.

83. 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 59th Electronic Materials Conference (EMC 2017)*, Notre Dame, Indiana, Jun. 2017.

84. 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 44th IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017.

85. 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 44th IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017. **[Best Poster Award in "Low-Cost III-V" topic area]**

86. 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 44th IEEE Photovoltaic Specialists Conference (PVSC-44)*, Washington DC, Jun. 2017.

87. 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.

88. **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.

89. ***(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.

90. 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 AlGaN/GaN HFETs," *The 4th IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA 2016)*, Fayetteville, Arkansas, Nov. 2016.

91. 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" (A2.4.04), *International Workshop on Nitride Semiconductors (IWN 2016)*, Orlando, Florida, Oct. 2016.

92. S. Shervin, S.-H. Kim, M. Asadirad, K.-H. Lee, and **J.-H. Ryou***, "Multifunctional flexible III-nitride-based electronic and photonic devices: Numerical study on device performance characteristics and new functionality by external bending strain" (D2.3.12), *International Workshop on Nitride Semiconductors (IWN 2016)*, Orlando, Florida, Oct. 2016.

93. 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.

94. S. K. Oh, T. Jang, **J.-H. Ryou**, Y. J. Jo, H.-Y. Ko, and J. S. Kwak, "Significantly enhanced output power in AlGaN/GaN HFETs with multi-layer metallization" (PS1), *The 58th Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.

95. 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 58th Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.

96. 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 58th Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.

97. 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 58th Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.

98. 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 43rd IEEE Photovoltaic Specialists Conference (PVSC-43)*, Portland, Oregon, Jun. 2016.

99. 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 43rd IEEE Photovoltaic Specialists Conference (PVSC-43)*, Portland, Oregon, Jun. 2016.

100. X. Li, H. Xie, F. Ponce, **J.-H. Ryou**, T. Detchprohm, and R. D. Dupuis, "Onset of deep UV surface stimulated emission from AlGaN multiple quantum wells"(JthA2.45), *Conference on Lasers and Electro-Optics: Applications and Technology 2016 (CLEO 2016)*, San Jose, California, Jun. 2016.

101. 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.

102. 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.

103. ***(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 14th International Union of Materials Research Societies-International Conference on Advanced Materials (IUMRS-ICAM 2015)*, Jeju, Korea, Oct. 2015.

104. ***(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.

105. 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 12th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2015)*, Atlanta, Georgia, Jul.-Aug. 2015.

106. 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 12th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC 2015)*, Atlanta, Georgia, Jul.-Aug. 2015.

107. 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 57th Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.

108. S. Shervin, S. H. Kim, M. Asadirad, and **J.-H. Ryou***, "Polarization engineering in InGaN/GaN flexible light-emitting diodes: internal quantum efficiency improvement and peak emission wavelength tuning" (Q9), *The 57th Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.

109. 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 57th Electronic Materials Conference (EMC 2015)*, Columbus, Ohio, Jun. 2015.

110. 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 42nd IEEE Photovoltaic Specialists Conference (PVSC-42)*, New Orleans, Louisiana, Jun. 2015.

111. ***(Invited talk)*** **J.-H. Ryou***, "Epitaxial growth, characterization, and devices of InAlN materials" (MOA1-1), *The 7th Asia-Pacific Workshop on Widegap Semiconductors (APWS 2015)*, Seoul, Korea, May 2015.

112. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **J.-H. Ryou**, A. M. Fischer, and F. A. Ponce, "The origins of auto-incorporation of gallium during epitaxial growth of InAlN alloy by metalorganic chemical vapor deposition" (Mon-Pa-3-4), *The 17th*

*International Conference on Metalorganic Vapor Phase Epitaxy (ICMOVPE XVII)*, Lausanne, Switzerland, Jul. 2014.

113. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **J.-H. Ryou**, A. M. Fischer, and F. A. Ponce, "The origin of gallium auto-incorporation in InAlN layers during epitaxial growth by metalorganic chemical vapor deposition" (A1), *The 56th Electronic Materials Conference (EMC 2014)*, Santa Barbara, California, Jun. 2014.

114. Y. Gao, P. Dutta, M. Rathi, Y. Yao, M. Iliev, **J.-H. Ryou**, and V. Selvamanickam, "Heteroepitaxial silicon thin films on flexible polycrystalline metal substrates for crystalline photovoltaic solar cells: A comparison between physical vapor deposition and plasma-enhanced chemical vapor deposition" (383-J1), *The 40th IEEE Photovoltaic Specialists Conference (PVSC-40)*, Denver, Colorado, Jun. 2014.

115. ***(Invited talk)*** **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" (MB2-2) *The 5th International Conference on White LEDs and Solid State Lighting (WLED-5)*, Jeju, Korea, Jun. 2014.

116. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **J.-H. Ryou**, A. M. Fischer, and F. A. Ponce, "Gallium auto-incorporation in InAlN layers during epitaxial layer growth by metalorganic chemical vapor deposition," *The 5th International Symposium on Growth of III-Nitrides (ISGN-5)*, Atlanta, Georgia, May 2014.

117. ***(Invited talk)*** **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" (1517), *The 225th Electrochemical Society (ECS) Meeting: Q2. Wide Bandgap Semiconductor Materials and Devices 15*, Orlando, Florida, May 2014.

118. R. D. Dupuis, J. Kim, Z. Lochner, M.-H. Ji, T.-T. Kao, **J.-H. Ryou**, T. Detchprohm, and S.-C. Shen, "III-N high-power electronic devices" (1928), *224th Electrochemical Society (ECS) Meeting: E3. GaN and SiC Power Technologies*, San Francisco, California, Oct.-Nov. 2013.

119. R. D. Dupuis, J. Kim, T.-T. Kao, Y.-C. Lee, Z. Lochner, M.-H. Ji, **J.-H. Ryou**, T. Detchprohm, and S.-C. Shen, "Bipolar III-N high-power electronic devices," *The 1st IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA-2013)*, Columbus, Ohio, Oct. 2013.

120. J. Kim, T.-T. Kao, **J.-H. Ryou**, T. Detchprohm, S.-C. Shen, and R. D. Dupuis, "Performance improvement of NpN-GaN/InGaN/GaN heterojunction bipolar transistors on sapphire substrates by modified doping profile" (DP2.10), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

121. P. D. Yoder, Md. Satter, V. Kolesov, T. Philip, Y.-S. Liu, T.-T. Kao, Z. Lochner, **J.-H. Ryou**, S.-C. Shen, T. Detchprohm, and R. D. Dupuis, "Theoretical analysis of strategies for improving p-type conductivity in wurtzite III-nitride devices for high-power opto- and microelectronic applications" (CP3.10), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

122. X.-H. Li, Z. Lochner, Y.-S. Liu, T.-T. Kao, Md. M. Satter, **J.-H. Ryou**, S.-C. Shen, P. D. Yoder, T. Detchprohm, and R. D. Dupuis, "Stimulated emission at 256.1 nm with a low threshold optical pumping power density from AlGaN multiple quantum well grown at high temperature on sapphire" (CP1.01), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

123. Y.-S. Liu, T.-T. Kao, Z. Lochner, X.-H. Li, Md. M. Satter, **J.-H. Ryou**, S.-C. Shen, P. D. Yoder, T. Detchprohm, and R. D. Dupuis, "Optically pumped AlGaN based deep-ultraviolet multi-quantum-well lasers grown by metalorganic chemical vapor deposition" (C1.03), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

124. **J.-H. Ryou***, J. Kim, S. Choi, H. J. Kim, Z. Lochner, M.-H. Ji, J. S. Kim, R. D. Dupuis, A. M. Fischer, R. Juday, Y. Huang, T. Li, J. Y. Huang, and F. A. Ponce, "Origins of gallium auto-incorporation during epitaxial growth of ternary InAlN layers on AlN and GaN" (A7.07), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

125. J. Kim, M.-H. Ji, Md. M. Satter, **J.-H. Ryou**, P. D. Yoder, T. Detchprohm, R. D. Dupuis, R. Juday, A. Fischer, and F. Ponce, "Role of p-$In_xGa_{1-x}N$ layer in enhancing hole transport and distribution in InGaN/GaN multiple quantum wells of visible III-nitride light-emitting diodes" (B4.03), *The 10th International Conference on Nitride Semiconductors (ICNS-10)*, Washington D.C., Aug. 2013.

126. **J.-H. Ryou***, J. Kim, S. Choi, H. J. Kim, Z. Lochner, M.-H. Ji, J. S. Kim, R. D. Dupuis, A. M. Fischer, R. Juday, Y. Huang, T. Li, J. Y. Huang, and F. A. Ponce, "Auto-incorporation of gallium in AlInN layers during epitaxial growth," *The 19th American Conference on Crystal Growth and Epitaxy (ACCGE-18)/16th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-16)*, Keystone, Colorado, Jul. 2013.

127. B. Jo, C.-R. Lee, J. S. Kim, M.-Y. Ryu, J.-Y. Leem, **J.-H. Ryou**, and R. D. Dupuis, "Effects of increase in the vertical confinement of carriers on the optical properties of InAs/InAlGaAs quantum dots," *The 19th American Conference on Crystal Growth and Epitaxy (ACCGE-18)/ The 16th US Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-16)*, Keystone, Colorado, Jul. 2013.

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278. X.-B. Zhang, **J.-H. Ryou**, R. D. Dupuis, L. He, R. Hull, G. Walter, and N. Holonyak, Jr., "Growth of Multiple stacked InP/InAlGaP quantum dots by metalorganic chemical vapor deposition" (JJ3), *The 47th Electronic Materials Conference (EMC2005)*, Santa Barbara, California, Jun. 2005.

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291. **J.-H. Ryou** and R. D. Dupuis, "Quantum dots coupled to QWs in InP QD lasers" (5.7), *Workshop on Compound Semiconductor Materials and Devices 2004 (WOCSEMMAD 2004)*, Pasadena, California, Mar. 2004.

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302. **J.-H. Ryou**, R. D. Dupuis, C. V. Reddy, V. Narayanamurti, D. T. Mathes, R. Hull, G. Walter, D. A. Kellogg, and N. Holonyak, Jr., "Characterizations of InP self-assembled quantum dots embedded in $In_{0.5}(Al_xGa_{1-x})_{0.5}P$ grown by metalorganic chemical vapor deposition" (U2), *The 43rd Electronic Materials Conference (EMC 2001)*, Notre Dame, Indiana, Jun. 2001.

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304. ***(Invited talk)*** R. D. Dupuis, **J.-H. Ryou**, G. Walter, N. Holonyak, Jr., D. T. Mathes, R. Hull, C. V. Reddy, and V. Narayanamurti, "Properties of InP self-assembled quantum dots embedded in $In_{0.49}(Al_xGa_{1-x})_{0.51}P$ grown by metalorganic chemical vapor deposition" (QWR/QD.01i), *The 9th International Symposium of Nanostructures: Physics and Technology (Nanostructures 2001)*, St. Petersburg, Russia, Jun. 2001.

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307. **J.-H. Ryou**, R. D. Dupuis, C. V. Reddy, V. Narayanamurti, D. T. Mathes, R. Hull, A. Mintairov, and J. L. Merz, "Growth and characterization of InP self-assembled quantum dots on GaAs substrate" (BB5), *The 42nd Electronic Materials Conference (EMC 2000)*, Denver, Colorado, Jun. 2000.

308. **J.-H. Ryou**, R. D. Dupuis, C. V. Reddy, V. Narayanamurti, D. T. Mathes, and R. Hull, "InP and InAlP self-assembled quantum dots grown by metalorganic chemical vapor deposition" (TUA1.4), *The 12th International Conference on InP and Related Materials (IPRM 2000)*, Williamsburg, Virginia, May 2000.

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313. **J.-H. Ryou**, J. S. Park, U. Chowdhury, R. D. Dupuis, D. T. Mathes, and R. Hull, "Compliant substrate study using InP twist bonding" (AA9), *The 40th Electronic Materials Conference (EMC 98)*, Charlottesville, Virginia, Jun. 1998.

314. **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 2nd 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 Semiconductor Education Program for Awareness and Workforce Training for Students in Houston Area (SEP-Houston), PI, Jan. 2025 – Dec. 2025, UH, Micron Foundation.
2. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Energy, and Sensing Applications, PI, Sep. 2024 – Aug. 2025, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
3. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Energy, and Sensing Applications, PI, Sep. 2023 – Aug. 2024, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
4. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Piezoelectric, Energy, and Biomedical Applications, PI, Sep. 2022 – Aug. 2023, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
5. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Piezoelectric, Energy, and Biomedical Applications, PI, Sep. 2021 – Aug. 2022, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
6. Design of Near IR Light Sources, UH, PI, Dec. 2020 – Nov. 2021, Hana Optronics.
7. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Energy, and Biomedical Applications, PI, Sep. 2020 – Aug. 2021, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
8. Design of VCSELs, UH, PI, Jan. 2020 – Dec. 2020, Hana Optronics.
9. New Hybrid Materials and Device Technologies for High-Throughput and Low-Cost Manufacturing of Wearable/Implantable Healthcare Monitoring Systems, PI, Jan. 2020 – Dec. 2020, UH, Advanced Manufacturing Institute (AMI).
10. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Energy, and Biomedical Applications, PI, Sep. 2019 – Aug. 2020, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
11. I-CORPS: Flexible and Bendable Electronic and Photonic Device Platform, PI, Dec. 2018 – May 2019, UH, National Science Foundation (NSF), ENG/IIP.
12. 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.

13. 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).
14. 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), ENG/ECCS.
15. Design of Epitaxial Structures of Vertical-Cavity Surface-Emitting Lasers (VCSELs) Based on GaAs Materials, PI, Mar. 2017 – Dec. 2018, UH, LG Innotek.
16. 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).
17. Development of Epitaxial Structure Design and Growth Technology of Semiconductor Lasers, PI, Jun. 2017 – Dec. 2017, UH, LG Innotek.
18. X-ray Diffraction Analysis of Semiconductor Superlattice Structures, PI, Nov. 2016 – Jan. 2017, UH, Applied Optoelectronics Inc.
19. Analysis of Amorphous Carbon Films on TEOS/Si Substrates, PI, Nov. 2016 – Dec. 2016, UH, TEL Technology Center America.
20. 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).
21. 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.
22. 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).
23. Epitaxial Structure Development for III-Nitride-Based Schottky Junction Power Devices, PI, 2008 – 2009, Georgia Tech, Alpha and Omega Semiconductors.
24. 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.
25. Development of Commercial 650-nm Red VCSEL, PI, 2001 – 2003, Honeywell Technology Center (HTC).

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

1. Next-Generation Microelectronics Manufacturing Center, Jul. 2024 – Jul 2029, DARPA-UT Texas Electronics Institute.
2. AI Applications in Energy Storage and Harvesting, Co-PI, Mar. 2024 – Dec/ 2024, UH Seed Grant.

3. Development of LIDAR transmission module based on reverse p-n junction epitaxial structure for common anode VCSEL, Co-PI, Apr. 2023 – Dec. 2025, Korea Evaluation Institute of Industrial Technology (KEIT).
4. Development of epitaxial materials and devices for vertical GaN power electronics, Co-PI, Jul. 2022 – Dec. 2026, Korea Evaluation Institute of Industrial Technology (KEIT).
5. Development of the system semiconductor package for augmented reality capable of detecting high-speed 3D image based on vertical-cavity surface-emitting laser, Co-PI, Jul. 2021 – Dec. 2023, Korea Evaluation Institute of Industrial Technology (KEIT).
6. MRSEC: Houston Center for Advanced Materials and Manufacturing (H-CAMM), Co-PI, Mar. 2022 – Dec. 2022, UH National Center Proposal Grant (NCPG).
7. Development of the system semiconductor package for augmented reality capable of detecting high-speed 3D image based on vertical-cavity surface-emitting laser, Co-PI, Jul. 2021 – Dec. 2023, Korea Evaluation Institute of Industrial Technology (KEIT).
8. Investigation of Controlled Bending Strain in Deep UV LED Efficiency, Co-PI, Apr. 2017 – Mar. 2021, King Abdallah University of Science and Technology (KAUST).
9. Physical Property Measurement System, Co-PI, Aug. 2015 – Aug. 2016, Office of Naval Research (ONR), DURIP Program.
10. 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).
11. Advanced Middle-UV Coherent Optical Sources, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), CMUVT program.
12. Fundamental Study of Defect Reduction in Type-II Superlattice Materials, Co-PI, 2010 – 2012, Georgia Tech, Army Research Office (ARO), MURI.
13. Collaborative Research: Nanobeam Lasers, Co-PI, 2010 – 2012, Georgia Tech, National Science Foundation (NSF), ECCS.
14. 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.
15. Development of Nitride Electronic Next Generation Technology, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), NeXT program, subcontract from HRL.
16. E-Mode III-Nitride High-Voltage Transistor Development, Co-PI, 2009 – 2012, Georgia Tech, Intersil Corp.
17. 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.

18. 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.
19. 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).
20. Novel High-Performance III-N HBTs for Next-Generation Energy-Efficiency Systems, Co-PI, 2007 – 2011, Georgia Tech, National Science Foundation (NSF), ECCS.
21. Development of High-Efficiency InGaN-Based Green Lasers, Co-PI, 2007 – 2010, Georgia Tech, Defense Advanced Projects Agency (DARPA), VIGIL program.
22. 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**, Shahab Shervin, and Seung-Hwan Kim, "Externally-strain-engineered semiconductor photonic and electronic devices and assemblies and methods of making same," US Patent **10897120** (Jan. 19, 2021).
2. **Jae-Hyun Ryou**, Shahab Shervin, and Seung-Hwan Kim, "Externally-strain-engineered semiconductor photonic and electronic devices and assemblies and methods of making same," US Patent **10476234** (Nov. 12, 2019).
3. **Jae-Hyun Ryou**, "Flexible single-crystalline semiconductor device fabrication and methods of thereof," US Patent **10411035** (Sep. 10, 2019).
4. **Jae-Hyun Ryou**, "Flexible single-crystalline semiconductor device fabrication and methods of thereof," US Patent **9831273** (Nov. 27, 2017).
5. 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).
6. 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).
7. 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).
8. **Jae-Hyun Ryou** and Gyoungwon Park, "Dielectric VCSEL gain guide," US Patent **7277461** (Oct. 2, 2007).

9. **Jae-Hyun Ryou**, "Pseudomorphic layer in tunnel junction," US Patent **7136406** (Nov. 14, 2006).
10. **Jae-Hyun Ryou**, Michael D. Ringle, and Yue Liu, "VCSEL having thermal management," US Patent **7075962** (Jul. 11, 2006).
11. **Jae-Hyun Ryou**, Tzu-Yu Wang, Jin K. Kim, Gyoungwon Park, and Hoki Kwon, "Enhanced lateral oxidation," US Patent **7054345** (May 30, 2006).
12. 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*

1. **Jae-Hyun Ryou**, Mina Moradnia, Sara Pouladi, and Muhammad Aqib, "Crack-free ultrawide-bandgap group-III-nitride semiconductor films deposited on silicon substrate," (UHID: 2023-054; patent application filed to US PTO in Aug. 2024, US 63/532595, PCT/US24/42307).
2. **Jae-Hyun Ryou** and Nam-In Kim, "Skin-attachable sensor system and method for tracking eye movement and position," (UHID: 2021-054; patent application filed to US PTO in Jun. 2022, US 63/213,048, PCT/US2022/034279).
3. **Jae-Hyun Ryou**, Mina Moradnia, Arul Chakkaravarthi Arjunan, and Gary Tompa, "Hybrid chemical and physical vapor deposition of transition-metal-alloyed wide-bandgap piezoelectric semiconductor films and methods of thereof," (UHID: 2021-075; patent application filed to US PTO in Dec. 2022, 18/083,236).
4. **Jae-Hyun Ryou** and Jie Chen, "Single-crystalline III-nitride thin film-based flexible piezoelectric pulse sensor and methods of making thereof," (provisional patent application filed to US PTO in Apr. 2019, (Application #: 62835881).
5. **Jae-Hyun Ryou**, Jie Chen, Seung Kyu Oh, and Shahab Shervin, "Fabrication and use of III-nitride thin-film-based piezoelectric devices," (provisional patent application filed to US PTO in Oct. 2017 (UHID: 2017-059; Application #: 62571040; Doc #: 2483-10400)).
6. **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)).

## *Invention Disclosures Filed*

7. **Jae-Hyun Ryou** and Nam-In Kim, "Skin-attachable sensor for easy and continuous measurement of human stress levels and methods of making thereof," (invention disclosure in preparation).

## Invited Lecture/Seminar Presentations

1. **Jeonbuk National University**, G-LAMP, Jeonju, Korea, "Emerging Ultrawide-Bandgap Semiconductors for Electronics, Photonics, Energy, and Sensing," Feb. 2025.
2. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Energy and Sensing Applications," Oct. 2024.
3. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, "Self-Mixing Interferometry Using Vertical-Cavity Surface-Emitting Lasers II: Modeling and Applications," Oct. 2024.
4. **Kyma Technologies**, Raleigh, North Carolina, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Extreme-Condition Photonic, Electronic, Energy Applications and Personal Healthcare Monitoring Applications," Sep. 2024.
5. **Texas A&M University**, Department of Electrical and Computer Engineering, College Station, Texas, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Energy and Sensing Applications," Sep. 2024.
6. **Army Research Laboratory**, Adelphi, Maryland, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Extreme-Condition Photonic, Electronic, Energy Applications and Personal Healthcare Monitoring Applications," Aug. 2024.
7. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, "Self-Mixing Interferometry Using Vertical-Cavity Surface-Emitting Lasers: Fundamentals and Applications," Jul. 2024.
8. **Jeonbuk National University**, Department of Materials Science and Engineering, Jeonju, Korea, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Extreme-Condition Photonic, Electronic, Energy Applications and Personal Healthcare Monitoring Applications," Jun. 2024.
9. **Yonsei University**, Department of Mechanical Engineering, Seoul, Korea, "Flexible Multifunctional Wide-Bandgap Semiconductor Materials and Devices for Extreme-Condition Photonic, Electronic, Energy Applications and Personal Healthcare Monitoring Applications," Jun. 2024.
10. ***The 7th IEEE Electron Devices Technology and Manufacturing (IEEE EDTM 2023)***, Seoul, Korea, "Shout Course: Wide Bandgap Semiconductor Devices, New Device Applications of III-N Materials,", Mar. 2023.
11. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "TcSUH Bi-Weekly Seminar Series: Ultrawide-Bandgap Semiconductor Materials and Devices for Biocompatible and Extreme-Environment Applications," Dec. 2022.

12. **King Abdullah University of Science and Technology (KAUST)**, Computer, Electrical and Mathematical Science and Engineering Division (CEMSE), Thuwal, Saudi Arabia, "Flexible Electronics Beyond Mechanical Flexibility: Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications," Nov. 2022.
13. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, "Fundamentals and Device Physics for Design of High-Power Vertical-Cavity Surface-Emitting Lasers: Tunnel Junctions for Cascade VCSELs and Active Region Design," Jun. 2022.
14. **Electronics and Telecommunications Research Institute (ETRI)**, Daejeon, Korea, "Flexible Electronics Beyond Mechanical Flexibility: Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications," Mar. 2022.
15. **University of Houston**, Department of Electrical and Computer Engineering, Houston, Texas, "Flexible Electronics Beyond Mechanical Flexibility: Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications," Feb. 2022.
16. **Auburn University**, Department of Physics, Auburn, Alabama, "Flexible Electronics Beyond Mechanical Flexibility: Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications," Feb. 2022.
17. **Sungkyunkwan University**, Department of Energy Science, Suwon, Korea, "Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications," Mar. 2021.
18. **University of Texas at Dallas**, Department of Materials Science and Engineering, Richardson, Texas, "Multifunctional Flexible Semiconductor Materials and Devices for Photonic, Electronic, Energy, and Sensing Applications," Oct. 2020.
19. **Hana Optronics**, Asan, Korea, "Device Physics of VCSELs," Aug. 2020.
20. **King Abdullah University of Science and Technology (KAUST)**, Computer, Electrical and Mathematical Science and Engineering Division (CEMSE), Thuwal, Saudi Arabia, "Multifunctional Flexible Semiconductor Materials and Devices for Photonic, Electronic, Energy, and Sensing Applications," May. 2020.
21. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "TcSUH Bi-Weekly Seminar Series: Semiconductor Materials and Devices for Energy Applications," Nov. 2019.
22. **Texas Center for Superconductivity at the University of Houston (TcSUH)**, University of Houston, Houston, Texas, "TcSUH Bi-Weekly Seminar Series: Multifunctional Flexible Semiconductor Materials and Devices for Photonic, Electronic, and Energy Applications," Feb. 2019.
23. **Korea University**, Department of Chemical Engineering, Seoul, Korea, "Multifunctional flexible semiconductor materials and devices for photonic, electronic, and energy applications," Jan. 2019.

24. **Korea Institute of Ceramic Engineering and Technology (KICET)**, Jinju, Korea, "Multifunctional flexible semiconductor materials and devices for photonic, electronic, and energy applications," Jan. 2019.

25. **Seoul National University**, School of Materials Science and Engineering, Seoul, Korea, "Multifunctional flexible semiconductor materials and devices for photonic, electronic, and energy applications," Dec. 2018.

26. **Korea Photonics Research Institute (KOPTI)**, Gwangju, Korea, "Semiconductor materials and devices for photonic, electronic, and energy applications," Dec. 2018.

27. **LG Innotek**, Paju, Korea, "Semiconductor materials and devices for photonic, electronic, and energy applications," Dec. 2018.

28. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Jan. 2018.

29. **Korea Photonics Research Institute (KOPTI)**, Gwangju, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Jan. 2018.

30. **Hanyang University**, Department of Materials Science and Engineering, Seoul, Korea, "High-performance multifunctional flexible semiconductor materials and devices," Dec. 2017.

31. **LG Innotek**, Paju, Korea, "Fundamentals of vertical-cavity surface emitting lasers," Sep. 2017.

32. **Korea Electronics Technology Institute**, Seongnam, Korea, "High-performance multifunctional flexible semiconductor devices," Sep. 2017.

33. **LG Innotek**, Paju, Korea, "Fundamentals of semiconductor laser diodes," May 2017.

34. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, "Metalorganic chemical vapor deposition of III-V compound semiconductors," May 2017.

35. **Samsung Advanced Institute of Technology**, Suwon, Korea, "High-performance flexible electronics based on single-crystal-like semiconductor thin films," May 2017.

36. **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.

37. **Korea Polytechnic University**, Department of Nano-Optical Engineering, Siheung, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.

38. **Seoul VIOSYS Co., Ltd.**, Ansan, Korea, "New trend in III-N-based photonic devices," Aug. 2016.

39. **Seoul National University**, School of Materials Science and Engineering, Seoul, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.

40. **Pohang University of Science and Technology**, School of Materials Science and Engineering, Pohang, Korea, "New functional semiconductor materials and electronic devices," Aug. 2016.

41. **Chonnam National University**, School of Materials Science and Engineering, Gwangju, Korea, "New functional semiconductor materials and electronic devices," May 2016.

42. **SungKyunKwan University**, Department of Energy Science, Suwon, Korea, "Semiconductor materials for energy science and applications," Feb. 2016.

43. **Hongik University**, School of Electronic and Electrical Engineering, Seoul, Korea, "New functional semiconductor materials and electronic devices," Nov. 2015.

44. **National Oilwell Varco**, Houston, Texas, "Active materials and devices based on semiconductors," Nov. 2015.

45. **Sunchon National University**, Department of Printed Electronics Engineering, Sunchon, Korea, "New functional semiconductor materials and devices," Oct. 2015.

46. **Applied Optoelectronics Inc.**, Sugar Land, Texas, "Metalorganic chemical vapor deposition, an introduction," Sep. 2015.

47. **Georgia Institute of Technology**, School of Electrical and Computer Engineering, Atlanta, Georgia, "New functional semiconductor materials and devices," Jul. 2015.

48. **Korea Institute of Science and Technology (KIST)**, Post-Silicon Semiconductor Institute, Seoul, Korea, "New functional semiconductor materials and devices," May 2015.

49. **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.

50. **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.

51. **Yonsei University**, School of Integrated Technology, Incheon, Korea, "Historical perspectives of semiconductor technology development and new functional semiconductor materials and devices," May 2015.

52. **Yonsei University**, School of Materials Science and Engineering, Seoul, Korea, "New functional semiconductor materials and devices," May 2015.

53. **SungKyunKwan University**, Graduate Program of Energy System Engineering, Suwon, Korea, "Energy-saving semiconductor materials and devices," Feb. 2015.

54. **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.

55. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.

56. **LG Innotek**, Paju, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.

57. **Hanyang University**, Department of Electronics and Communication Engineering, Ansan, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.

58. **Korea Polytechnic University**, Department of Nano-Optical Engineering, Siheung, Korea, "GaN-based photonic and electronic materials and devices," Jun. 2014.

59. **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.

60. **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.

61. **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.

62. **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.

63. **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.

64. **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.

65. **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.

66. **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.

67. **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.

68. **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.

69. **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.

70. **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.

71. **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.

72. **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.

73. **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.

74. **Samsung Electro-mechanics Inc.**, Suwon, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.

75. **Epivalley Inc.**, Gwangju, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.

76. **Samsung Advanced Institute of Technology (SAIT)**, Giheung, Korea, "Photonic and electronic materials and devices based on III-V Compound semiconductors," Jun. 2006.

77. **LG Institute of Electronics**, Seoul, Korea, "Photonic and electronic materials and devices based on III-V compound semiconductors," Jun. 2006.

78. **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)

1. Deborah Borfitz, "Psst! Need a Simple and Reliable Eye Tracker for Your Brain Studies?" *Clinical Research News*, October 15, 2024. https://www.clinicalresearchnewsonline.com/news/2024/10/15/psst!-need-a-simple-and-reliable-eye-tracker-for-your-brain-studies

2. Deborah Borfitz, "New Eye Tracker Could Ease Diagnoses for Neurological Disorders," *Diagnostics World News*, October 16, 2024. https://www.diagnosticsworldnews.com/news/2024/10/16/new-eye-tracker-could-ease-diagnoses-for-neurological-disorders

3. ***(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

1. A. Ali and **J.-H. Ryou**, "Wireless power transfer to healthcare devices using biocompatible III-Nitride piezoelectric materials," *The 30th TcSUH Graduate Student/Post-Doctoral Scholar Seminar*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Nov. 2024.

2. M. Aqib and **J.-H. Ryou**, "Crack-free single-crystalline ultrawide bandgap semiconductor film growth on Si substrate for next-generation semiconductor applications in electronics, sensing, photonics, and energy harvesting," *The 59th TcSUH Student Research Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2024. **[Symposium Winner (1st Place)]**

3. M. Aqib and **J.-H. Ryou**, "Strain accumulation and relaxation in III-N film on Si (111) substrate: A consideration on crack formation in epitaxial growth of ultrawide-bandgap semiconductor films," *The 22nd TcSUH Graduate Student/Post-Doctoral Scholar Seminar*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Nov. 2023.

4. M. Moradnia and **J.-H. Ryou**, "Single-crystalline III-N film growth for photonic, electronic, sensing, and energy harvesting applications," *The 58th TcSUH Student Research Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2023. **[Symposium Winner (2nd Place)]**

5. M. Moradnia and **J.-H. Ryou**, "Single-crystalline III-N film growth for photonic, electronic, sensing, and energy harvesting applications," *The 16th TcSUH Student Research Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Jan. 2023.

6. M. Yarali and **J.-H. Ryou**, "Pressure monitoring in harsh environments and extremely high temperatures using highly flexible piezoelectric sensor made of ultrawide-bandgap III-N thin film," *The 13th TcSUH Graduate Student/Post-Doctoral Scholar Seminar*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Oct. 2022.

7. N.-I. Kim and **J.-H. Ryou**, "Flexible piezoelectric sensors made of single-crystalline III-N thin films for personal-healthcare and harsh-environment applications," *The 57th TcSUH Student Research Symposium*, Texas Center for Superconductivity at the

University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2022. **[Symposium Winner (3rd Place)]**

8. N.-I. Kim and **J.-H. Ryou**, "Detection of human stress hormones by skin-attachable piezoelectric single-crystalline III-N thin-film sensor," *The 11th TcSUH Graduate Student/Post-Doctoral Scholar Seminar*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2022.

9. J. Chen and **J.-H. Ryou**, "Flexible piezoelectric generators and pulse sensors using single-crystalline III-N thin film," *The 56th TcSUH Semiannual Student Symposium*, Texas Center for Superconductivity at the University of Houston (TcSUH), University of Houston, Houston, Texas, Apr. 2019. **[Symposium Winner (2nd Place)]**

10. 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.

11. 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.

12. 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.

13. 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)]**

14. 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.

15. 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)]**

16. 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.

17. 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.

18. 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.
19. 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.
20. 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.
21. 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.
22. 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/Instructional Development

## *Instructional Degree Program Developed*

- University of Houston, Graduate Certificate Program in "Semionconductor Engineering and Manufacturing" (2025 Fall)

## *Undergraduate Core Courses Developed/Taught*

- University of Houston, MECE2334 "Thermodynamics" (2023 Spring).
- University of Houston, MECE3345 "Materials Science" (2024 Fall, 2023 Fall, 2021 Spring, 2020 Spring, 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/Senior Elective Courses Developed/Taught*

- University of Houston, MECE6361 "Mechanical Behavior of Materials" (2024 Spring, and 2022 Fall).
- University of Houston, MECE5397/MECE6365 "Semiconductor Materials and Photonic and Electronic Devices" (2023 Spring, and 2019 Fall,).
- 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" (2024 Spring, 2022 Spring, 2021 Fall, 2020 Fall, and 2016 Spring).
- 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" (2018 Winter, 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).

## *Teaching Evaluation*

- Evaluation score is a class average (section average) score out of 5 points based on Instructor Evaluation Report.
- Normalized scores are calculated by class average (section average) over level average.

| Term | Course Number | Evaluation Score | Normalized Score |
|---|---|---|---|
| 2012 Fall | MECE 2236 | 4.67 | 1.12 |
| 2013 Spring | MECE 5397/6397 | 4.56 | 1.04 |
| 2013 Fall | MECE 3245 | 4.39 | 1.10 |
| 2014 Spring | MECE 6364 | 4.37 | 1.00 |
| 2014 Fall | MECE 3245 | 4.50 | 1.10 |
| 2015 Spring | MECE 5397 / 6397 | 4.67 / 4.64 | 1.03 / 1.06 |
| 2015 Fall | MECE 3345 | 4.48 | 1.11 |
| 2016 Spring | MECE 5397 / 6397 | 4.50 / 4.62 | 1.03 / 1.06 |
| 2016 Fall | MECE 3245 | 4.70 | 1.17 |
| 2017 Spring | MECE 3345 | 4.42 | 1.08 |
| 2017 Fall | MECE 5397 / 6397 | 4.50 / 4.80 | 1.15 / 1.12 |
| 2018 Spring | MECE 3345 | 4.60 | 1.10 |
| 2018 Fall | MECE 5397 / 6340 | 4.18 / 4.00 | 1.00 / 0.93 |
| 2019 Spring | MECE 3345 | 4.10 | 1.00 |
| 2019 Fall | MECE 5397 / 6365 | 4.60 / 4.80 | 1.07 / 1.09 |
| 2020 Spring | MECE 3345 | 4.10 | 0.98 |
| 2020 Fall | MECE 5397 / 6397 | 4.70 / 4.80 | 1.15 / 1.09 |
| 2021 Spring | MECE 3345 | 4.60 | 1.12 |
| 2021 Fall | MECE 5397 / 6397 | 4.30 / 4.80 | 1.08 / 1.12 |
| 2022 Spring | MECE 5397 / 6397 | 4.56 / 4.65 | 1.05 /1.04 |
| 2022 Fall | MECE 3345 | 4.75 | 1.14 |
| 2022 Fall | MECE 6361-01 / 02 / 03 | 4.65 / 4.25 / 4.83 | 1.03 / 0.94 / 1.07 |
| 2023 Spring | MECE 2334 | 4.29 | 0.98 |
| 2023 Spring | MECE 5397 / 6365-01 / 02 / 03 | 4.15 / 4.78 / 4.75 / 4.64 | 0.98 / 1.04 / 1.04 / 1.01 |
| 2023 Fall | MECE 3345-02 / 03 | 4.21 / 4.94 | 1.00 / 1.17 |

| | | | |
|---|---|---|---|
| 2024 Spring | MECE 5397-07 | 4.64 | 1.08 |
| 2024 Spring | MECE 6361-01 / 02 / 03 | 4.74 / 4.43 / 4.50 | 1.04 / 0.97 / 0.99 |
| 2024 Fall | MECE 3345 | 4.31 | 1.00 |

### *Instructional Materials Developed*

- Sustainable energy harvesting and consumption education kit.

## Student Development

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

1. Nipun Sutradhar (UH, Mechanical Engineering, Ph.D. student), Fall 2024 – present.
2. Asad Ali (UH, Mechanical Engineering, Ph.D. candidate), Fall 2022 – present.
3. Muhammad Aqib (UH, Mechanical Engineering, Ph.D. candidate), Spring 2022 – present.
4. Dr. Mina Moradnia (UH, Mechanical Engineering, Ph.D.): 2018 Fall – 2023 Spring, Dissertation: *Single-Crystalline III-N Film Growth for Photonic, Electronic, Sensing, and Energy Harvesting Applications*. Currently with Zetta Energy
5. Dr. Miad Yarali (UH, Materials Science and Engineering, Ph.D.): Spring 2021 – Fall 2022, Dissertation: *Ultra-Wide Bandgap AlN-Based Semiconductor Materials for Optoelectronic and Sensing Devices*. Currently with Samsung Austin Semiconductor.
6. Dr. Nam-In Kim (UH, Materials Science and Engineering, Ph.D.): Spring 2019 – Summer 2022, Dissertation: *Flexible Piezoelectric Sensors Based on Single-Crystalline III-N Films for Personal Healthcare and Extreme-Environment Applications*. **[Best Dissertation Award of Cullen College of Engineering and Materials Science and Engineering Program, 2022]** Currently with University of Houston.
7. Dr. Weijie Wang (UH, Mechanical Engineering, Ph.D.): 2015 Fall – 2019 Fall, Dissertation: *Strain Effect in III-N Thin Film Based High Electron Mobility Transistors*. **[Best Dissertation Award of Department of Mechanical Engineering, Spring 2019]** Currently with Lam Research.
8. Dr. Sara Pouladi (UH, Materials Science and Engineering, Ph.D.): 2015 Spring – 2020 Spring, Dissertation: *High-Efficiency Flexible Thin-Film Single-Crystal-Like GaAs Solar Cells Based on Cheap Metal Tape*. **[Best Dissertation Award of Materials Science and Engineering Program, Spring 2020]** Currently with University of Houston.
9. Dr. Jie Chen (UH, Materials Science and Engineering, Ph.D.): 2015 Fall – 2019 Summer, Dissertation: *Flexible Piezoelectric Generators and Pulse Sensors Using Single-Crystalline III-N Thin Films*. **[Best Dissertation Award of Cullen College of**

**Engineering and Materials Science and Engineering Program, Spring 2019]** Currently with Applied Optoelectronics Inc.

10. Dr. Shahab Shervin (UH, Materials Science and Engineering, Ph.D.): 2013 Fall – 2017 Spring, Dissertation: *Flexible III-Nitride-Based Materials and Devices for Electronic and Photonic Applications*. **[Best Dissertation Award of Materials Science and Engineering Program, Spring 2017]** Currently with ASML.
11. Dr. Mojtaba Asadirad (UH, Materials Science and Engineering, Ph.D.): 2023 Spring – 2016 Summer, Dissertation: *High-Performance Flexible Thin-Film Electronics Based on Single-Crystal-Like Inorganic Semiconductor Materials*. **[Best Dissertation of Materials Science and Engineering Program, Spring 2016]** Currently with Micron Technology.

## *Graduate Students Advised (M.S.)*

1. Rheno Paul Rajesh Kumar (UH, Materials Science and Engineering, M.S.): Spring 2023 – Spring 2024, Thesis: *Calculation of Critical Thickness and Ion Penetration in Epitaxial Film for Monolithic Integration and Layer Transfer of Semiconductor Heterostructures*. Currently with Intel.
2. Crystal Ly (UH, Mechanical Engineering, M.S.) Spring 2023 – Fall 2024, Thesis: *Modeling and Analysis of an AlN Piezoelectric Micro-Swimmer with Integrated Gold Electrodes*. Currently with Air Force Research Laboratory.
3. Onosetale Aigbe (UH, Mechanical Engineering, M.S.): Spring 2020 – Spring 2021, Thesis: *Thermodynamic Calculation of Mixing Gibbs Free Energy of Group III-Transition-Metal- Nitride for Piezoelectric Applications*. Currently with Alliant Group.
4. Yu-Li Chang (UH, Materials Science and Engineering, M.S.): Fall 2017 – Summer 2018, Thesis: *Fabrication and Properties of III-Nitride Piezoelectric Sensors*. Currently with Applied Optoelectronics Inc.
5. Bharath Dixit (UH, Materials Science and Engineering, M.S.): Summer 2015 – Fall 2016. Currently with ADVANTEST.
6. Weijie Wang (UH, Mechanical Engineering, M.S.): Summer 2014 – Summer 2015, Thesis: *GaN Characterization Using X-Ray Techniques*. Currently with Lam Research.

## *Post-Doctoral Fellows Advised*

1. Dr. Nam-In Kim (UH, currently with UH), Sep 2022 – present.
2. Dr. Sara Pouladi (UH, currently with UH), May 2020 – present.
3. Dr. Weijie Wang (UH, currently with LAM Research), Feb. 2020 – Mar. 2020.
4. Dr. Jie Chen (UH, currently Applied Optoelectronics Inc.), Oct. 2019 – Dec. 2019.
5. Dr. Shivkant Dasrath Singh (UH), Oct. 2018 – Jul. 2019.

6. Dr. Shahab Shervin (UH, currently with ASML), Jun. 2017 – Aug. 2019.
7. Dr. Mojtaba Asadirad (UH, currently with Micron Technology), Sep. 2016 – Jan. 2017.
8. Dr. Seung Kyu Oh (UH, currently with Photon Wave Inc., Korea), May 2016 – May 2018.
9. Dr. Keon-Hwa Lee (UH, currently with Korea Photonics Technology Institute), Jan. 2015 – Jan. 2016.
10. Dr. Seung-Hwan Kim (UH, currently with Hongik University, Korea), May 2014 – Sep. 2015.
11. Dr. Srikanth Ravipati (UH, co-advisor with Prof. Mavrokefalos, currently with University of Louisville), Feb. 2013 – Sep. 2015.
12. Dr. Hee Jin Kim (Georgia Tech, co-advisor with Prof. Dupuis, currently with Philips LumiLEDs), 2010 – 2011.

## *Undergraduate Students Advised*

1. Arunabh Sarmah (UH, Mechanical Engineering, undergraduate research assistant), Jan. 2024 – present.
2. Roberto Morales (UH, Mechanical Engineering, undergraduate research assistant), Jun. 2023 – Dec. 2023.
3. Sean Bruzdoski (UH, Mechanical Engineering, undergraduate research assistant), Jun. 2022 – May 2023.
4. Kyle Le (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2020 – Dec. 2021.
5. Ogynan Stefanov (UH, Mechanical Engineering (from University of California, Berkeley), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2019 – Aug. 2019.
6. Tanner Barbee (UH, Mechanical Engineering), Jan. 2019 – Dec. 2019.
7. Heidi Johnson (UH, Mechanical Engineering (from Bingham Young University), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2018 – Aug. 2018.
8. Noor Nabulsi (UH, Mechanical Engineering, undergraduate research student, Provost's Undergraduate Research Scholarship (PURS) program), May 2017 – Jun. 2019.
9. 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.
10. Yang (Colby) Huai (UH, Mechanical Engineering, undergraduate research student, Senior Honor Thesis), Sep. 2016 – Dec. 2017, Thesis: Optimization of InAlGaN/GaN HEMT Device.

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

## *Middle- and High-School Teacher and Student Research Experience*

1. Kyle Zheng, Junior, Seven Lakes High School (Research Intern), Summer 2024.
2. Kumaran (Kumi) Selva, Junior, Clear Lake High School (Research Intern), Spring 2019, Fall 2019, Spring 2020.
3. Rahul Yesantharao, Senior, Clear Lake High School (Summer Research Intern), Summer 2014.
4. Preeti Joseph, Science teacher, Sttraford Middle School (Research Experience for Teachers), Summer 2015.

## *Visiting Scholars*

1. Ms. Jiyun Lee (Gyeonsang National University), Jun. 2022 – Jan. 2023.
2. Prof. Min-Ki Kwon (Chosun University, Korea), Jul. 2018 – Jul. 2019.
3. Dr. Ja-Yeon Kim (Korea Photonics Technology Institute), Jul. 2018 – Jul. 2019.
4. Prof. Hyunsoo Kim (Chonbuk National University, Korea), Aug. 2016 – Jul. 2017.
5. Prof. Seong-Nam Lee (Korea Polytechnic University), Jan. 2015 – Jan. 2016.

# Professional Service

## Session Chair

1. Session H: Wearable Electronics and Biosensors, *EMC 2024 (The 66th Electronic Materials Conference)*, College Park, Maryland, Jun. 2024.
2. Session H: 2D Materials, Devices and Sensors, *EMC 2023 (The 65th Electronic Materials Conference)*, Santa Barbara, California, Jun. 2023.
3. Session 28A: Power Devices and Wide-Bandgap Heterostructures 1, *IEEE EDTM 2023 The 7th IEEE Electron Devices Technology and Manufacturing Conference*, Seoul, Korea, Mar. 2023.
4. Session JJ: Printed and Flexible Thin Films, *EMC 2021 (The 63rd Electronic Materials Conference)*, Virtual Conference, Jun. 2021.
5. Session RR: Flexible, Printed and/or Dissolvable Thin Films or Nanomembranes, *EMC 2020 (The 62nd Electronic Materials Conference)*, Columbus, Ohio, Jun. 2020.
6. Session 6-1: Wide Bandgap Materials, Devices, and Circuits, *InterPACK 2019 (2019 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems)*, Anaheim, California, Oct. 2019.
7. Session: Advanced OMVPE Technology for Wide Bandgap III-Nitrides, *ICCGE-19 and OMVPE-19 (The 19th International Conference on Crystal Growth and Epitaxy and the 19th US Workshop on Organometallic Vapor Phase Epitaxy)*, Keystone, Colorado, Jul.-Aug. 2019.
8. Session: III-V Devices, *ICCGE-19 and OMVPE-19 (The 19th International Conference on Crystal Growth and Epitaxy and the 19th US Workshop on Organometallic Vapor Phase Epitaxy)*, Keystone, Colorado, Jul.-Aug. 2019.
9. Session X: III-Nitride Materials for Power Electronics, *EMC 2019 (The 61st Electronic Materials Conference)*, Ann Arbor, Michigan, Jun. 2019.
10. 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.
11. EEC Session: Optics/Optoelectronics, *UKC 2017 (The US-KOREA Conference on Science, Technology and Entrepreneurship 2017)*, Washington DC, Aug. 2017.
12. 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.

13. Session FF: III-Nitride Detectors, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
14. Session O: III-Nitride Defects and Characterization, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
15. 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.
16. Session MOA2: 07. Luminescence Properties, *APWS 2015 (The 7th Asia-Pacific Workshop on Widegap Semiconductors)*, Seoul, Korea, May 2015.
17. Session TB1: Nanoepitaxy for Novel LEDs II, *WLED-5 (The 5th International Conference on White LEDs and Solid State Lighting)*, Jeju, Korea, Jun. 2014.
18. Session G: Epitaxy and Characterization of InN, *ISGN-5 (The 5th International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.
19. Session A3: Optical Structure and Measurements, *ICNS-10 (The 10th International Conference on Nitride Semiconductors)*, Washington, D.C., Aug. 2013.
20. Session Q: HEMTS: Defects and Reliability, *EMC 2013 (The 55th Electronic Materials Conference)*, Norte Dame, Indiana, Jun. 2013.
21. 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.
22. Session GG: III-Nitrides: Non-Polar and Semi-Polar Devices, *EMC 2011 (The 53rd Electronic Materials Conference)*, Santa Barbara, California, Jun. 2011.
23. Session JJ: Nonpolar-Semipolar III-Ns, *EMC 2010 (The 52nd Electronic Materials Conference)*, Notre Dame, Indiana, Jun. 2010.
24. Session F: Group III Nitride Photodetectors and Photonic Lattices, *EMC 2008 (The 50th Electronic Materials Conference)*, Santa Barbara, California, Jun. 2008.
25. Session B: Microwave Devices, *ICNS-7 (The 7th International Conference on Nitride Semiconductors)*, Las Vegas, Nevada, Sep. 2007.
26. 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 Research Proposals*

1. Ralph E Powe Junior Faculty Award, Oak Ridge Associated Universities (ORAU)
2. Israel Science Foundation (ISF)
3. National Science Foundation (NSF), Division of Materials Research (DMR), Electronic and Photonic Materials (EPM)
4. National Science Foundation (NSF), Division of Electrical, Communications and Cyber Systems (ECCS), Electronic, Photonic, and Magnetic Devices (EPMD)
5. Department of Energy (DOE), Small Business Innovation Research (SBIR)

## *Reviewer of Professional Society*

1. Review panel of IEEE Senior Member applications

## *Reviewer of Technical Journals*

1. ACS Applied Materials & Interfaces, American Chemical Society (ACS)
2. ACS Nano, ACS
3. ACS Photonics, ACS
4. Acta Materialia, Acta Materialia/Elsevier
5. Advanced Electronic Materials, Willey
6. Advanced Energy Materials, Willey
7. Advanced Functional Materials, Willey
8. Advanced Intelligence Systems, Willey
9. Advanced Optical Materials, Willey
10. AIP Advances, American Institute of Physics (AIP)
11. Applied Materials Today, Elsevier
12. Applied Optics, Optical Society of America (OSA)
13. Applied Physics A:  Materials Science & Processing, Springer
14. Applied Physics B:  Lasers and Optics, Springer
15. Applied Physics Express, The Japan Society of Applied Physics (JSAP)
16. Applied Physics Letters, AIP
17. Applied Science, MDPI AG
18. Applied Surface Science, Elsevier
19. Chemical Vapour Deposition, Royal Society of Chemistry (RSC)
20. Chinese Physics Letters, Institute of Physics (IOP)

21. Current Applied Physics, Elsevier
22. Crystal Growth & Design, ACS
23. Electrochemical and Solid-State Letters, Electrochemical Society (ECS)
24. Electronics, MDPI AG
25. ETRI Journal, Electronics and Telecommunication Research Institute (ETRI)
26. IEEE Electron Device Letters, Institute of Electrical and Electronics Engineers (IEEE)
27. IEEE Journal of Electron Devices Society, IEEE
28. IEEE Journal of Quantum Electronics, IEEE
29. IEEE Journal of Selected Topics in Quantum Electronics, IEEE
30. IEEE Photonics Technology Letters, IEEE
31. IEEE Photonics Journal, IEEE
32. IEEE Transactions on Electron Devices, IEEE
33. Infrared Physics and Technology, Elsevier
34. Inorganic Chemistry Communications, Elsevier
35. Journal of Alloys and Compounds, Elsevier
36. Journal of Applied Physics, AIP
37. Journal of Crystal Growth, Elsevier
38. Journal of the Electrochemical Society, ECS
39. Journal of Electronic Materials, The Minerals, Metals & Materials Society (TMS)/IEEE
40. Journal of Materials Chemistry C: Materials for Optical, Magnetic and Electronic Devices, RSC
41. Journal of Materials Research and Technology, Elsevier
42. Journal of Physics and Chemistry of Solids, Elsevier
43. Journal of Physics D: Applied Physics, IOP
44. Journal of Semiconductors, IOP
45. Journal of Vacuum Science and Technology A: Vacuum, Surfaces, and Films, The American Vacuum Society (AVS)
46. Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures: Processing, Measurement, and Phenomena, AVS
47. Laser and Photonics Review, Wiley
48. Materials, MDPI AG
49. Materials Research Society Proceedings, Materials Research Society (MRS)

50. Materials Science and Engineering B: Advanced Functional Solid-State Materials, Elsevier
51. Micro & Nano Letters, Institution of Engineering and Technology (IET)
52. Micromachines, MDPI AG
53. Nano Energy, Elsevier
54. Nanoscale, RSC
55. Nanotechnology, IOP
56. Nanoscience and Nanotechnology Letters, American Scientific Publisher (APS)
57. Nature, Springer Nature
58. Nature Materials, Springer Nature
59. Nature Synthesis, Springer Nature
60. Optical and Quantum Electronics, Springer
61. Optics Communications, Elsevier
62. Optics Express, OSA
63. Optics and Laser Technology, Elsevier
64. Optics Letters, OSA
65. Physica Status Solidi A: Applications and Materials Science, Wiley
66. Physica Status Solidi B: Basic Solid State Physics, Wiley
67. Physica Status Solidi C: Current Topics in Solid State Physics, Wiley
68. Progress in Materials Science, Elsevier
69. Scientific Reports, Springer Nature
70. Semiconductor Science and Technology, IOP
71. Soft Science, OAE Publishing
72. Solar Energy, Elsevier
73. Solid State Electronics, Elsevier
74. Sustainable Energy & Fuels, RSC

## 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. Chair, *The 59th TcSUH Student Symposium*, University of Houston, Houston, Texas, Apr. 26, 2024.
2. Judge, *The 56th TcSUH Student Symposium*, University of Houston, Houston, Texas, Apr. 30, 2019.
3. Judge, *The 55th TcSUH Student Symposium*, University of Houston, Houston, Texas, May 1, 2018.
4. Judge, *MRS UH Chapter Student Symposium 2018*, University of Houston, Houston, Texas, Sep. 13, 2018.
5. Judge, *MRS UH Chapter Student Symposium 2017*, University of Houston, Houston, Texas, Apr. 5, 2017.
6. 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.
7. 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.
8. UH TcSUH representative, *Energy Day Houston 2015*, Sam Houston Park, Houston, Texas, Oct. 17, 2015.
9. 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.
10. UH Energy representative, *Earth Day Houston 2015*, Discovery Green, Apr. 11, 2015.
11. Judge, *University of Houston 2014-2015 Mars Rover Celebration*, Hilton University of Houston, Houston, Texas, Jan. 31, 2015.
12. UH TcSUH representative, *Energy Day Houston 2014*, Sam Houston Park, Houston, Texas, Oct. 18, 2014.
13. Judge, *Science and Engineering Fair of Houston (SEFH)*, George R. Brown Convention Center, Houston, Texas, Feb. 20, 2014.
14. 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 (and other departments), University of Houston*

1. Committee Member, Ph.D. Dissertation Award Committee, Fall 2024.
2. Committee Chair, Materials Group Qualifying Exam Committee, Spring 2024.
3. Committee Chair, Materials Group Faculty Search Committee, Fall 2023 – Spring 2024.
4. Committee Chair, Quantum Materials Presidential Frontier Faculty (PFF) Search Committee, Fall 2023 – Spring 2024.
5. Committee Member, Physics Quantum Materials Presidential Frontier Faculty (PFF) Search Committee, Fall 2023 – Spring 2024.
6. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2022.
7. Committee Chair, Materials Group Faculty Search Committee, Fall 2022 – Spring 2023.
8. Committee Chair, Materials Group Faculty Search Committee, Fall 2021 – Spring 2022.
9. Committee Chair, Materials Group Qualifying Exam Committee, Spring 2021.
10. Committee Chair, ABET Certificate Preparation Committee, Spring 2021 – Fall 2022.
11. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2020.
12. Committee Chair, Materials Group Faculty Search Committee, Fall 2020 – Spring 2021.
13. Director, Corrosion Engineering Certificate Program, Aug. 2020 – Aug. 2021
14. Committee Member, Materials Group Qualifying Exam Committee, Fall 2019.
15. Committee Chair, Materials Group Faculty Search Committee, Fall 2019 – Spring 2020.
16. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2018.
17. Undergraduate Advisor, Fall 2018, Spring 2019, Fall 2019, Spring 2020.

18. Committee Member, Graduate Program Reform Committee, Aug. 2018.
19. Committee Member, Materials Group Qualifying Exam Committee, Spring 2017.

## *Cullen College of Engineering, University of Houston*

1. Committee Member, Effective Instruction Committee, 2024
2. Committee Member, Innovator Award Selection Committee, 2021.

## *University of Houston*

1. Candidate, Faculty Senate At-large Committee, May 2024.
2. Candidate, Faculty Senate Research and Scholarship Committee, May 2023.