

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

Department of Mechanical & Aerospace Engineering,
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

- Professor Sep. 2025 – present
Associate Professor Sep. 2018 – Aug. 2025
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 December 1, 2025):

- 6 book chapters of books
- ~220 technical papers published in refereed journals
 - ✓ Citations of >8,400
 - ✓ h-index of 46
 - ✓ i10-index of 176
- ~320 contributed/invited presentations in technical conferences
 - ✓ >10 invited presentations in international conferences
- 13 US patents granted
- ~80 invited seminar presentations in academic institutions/industry/national labs

Research Projects

Leads research activities (as of December 1, 2025):

- 26 sponsored research projects as a PI
- 23 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. "Real-time monitoring of hand tremor and palmar hyperhidrosis using self-powered touch-free image sensor fabricated with semiconductor nanowires," *Chem. Eng. J.* 527, 171964 (2026). [\[IF: 13.2\]](#)
3. "Flexible III-N thin-film piezoelectric sensor for smart lithium-ion battery management system," *ACS Appl. Electron. Mater.* 7, 10853 (2025). [\[Featured supplementary-cover article, Corresponding author\]](#)

4. "Structural stabilization of 4.6 V LiCoO₂ through tri-site co-doping with Al-Mg-F," *Small* 21, 2409892 (2025). [IF: 13.0]
5. "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]
6. "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]
7. "All-around diamond for cooling high-power devices," *Nat. Electron.* 5, 834 (2022). [IF: 33.255, First and corresponding author]
8. "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].
9. "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]
10. "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]
11. "Modulation of the 2-dimensional electron gas channel in flexible AlGaIn/GaN high-electron-mobility transistors by mechanical bending," *Appl. Phys. Lett.* 116, 123501 (2020). [Featured editor's pick article, Corresponding author]
12. "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]
13. "Polarization modulation effect of BeO on AlGaIn/GaN high-electron-mobility transistors," *Appl. Phys. Lett.* 115, 103502 (2019). [Featured editor's pick article, Corresponding author]
14. "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]
15. "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]
16. "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]

17. "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](#)]
18. "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](#)]
19. "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](#)]
20. "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](#)]
21. "Temperature-dependent thermal conductivity of flexible yttria-stabilized zirconia substrate via 3 ω technique," *Phys. Status Solidi A* 214, 1700069 (2017). [[Featured back-cover article](#)]
22. "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](#)]
23. "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](#)]
24. "Temperature-dependent resonance energy transfer from semiconductor quantum wells to graphene," *Nano Lett.* 15, 896 (2015). [[IF: 11.238](#)]
25. "Ordered nanowire array blue/near-UV light emitting diodes," *Adv. Mater.* 22, 4749 (2010). [[IF: 27.398](#)]
26. "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](#)]
27. "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. R. Jada, J. Luan, and **J.-H. Ryou**, "Toward real-time monitoring of protein biomarkers: materials innovations for continuous sensing," *ACS Appl. Mater. Interfaces* (submitted in Dec. 2025).
3. S. Jhee, J. Shin, S. Kang, Y. Lee, J. Lee, N.-I. Kim, **J.-H. Ryou**, N. Ha, D. Kim, S. Na, and J. S. Kim, "Piezo-phototronic flexible photodetectors based on spatially aligned InN nanowires embedded in graphene channel," *Nanoscale* (submitted in Dec. 2025).
4. M. Aqib, S. Pouladi, N.-I. Kim, N. Sutradhar, A. Ali, and **J.-H. Ryou***, "Critical thickness for crack formation in AlN epitaxial films on foreign substrates," *Phys. Status Solidi A* (submitted in Nov. 2025).
5. S. Pouladi, Y. G. Lee, N.-I. Kim, K. Yu, K. H. Lee, and **J.-H. Ryou***, "Enhanced mode stability and reduced beam divergence in inverted junction oxide vertical-cavity surface-emitting laser arrays," *Phys. Status Solidi A* (submitted in Nov. 2025).
6. S. Jhee, J. Shin, S. Kang, C. K. Jeong, S. Noh, N.-I. Kim, **J.-H. Ryou**, and J. S. Kim, "Self-powered flexible motion sensors fabricated with InN nanowires coated with tungsten-disulfide nanosheets," *Sensor. Actuat. A - Phys.* (submitted in Nov. 2025).
7. J. Bae, D. Jung, Y. Jang, S. Han, H. Bong, H.-Y. Kim, J.-H. Park, D.-W. Jeon, P. R. Sultane, C. W. Bielawski, **J.-H. Ryou**, and J. Oh, "Band alignment of wide-bandgap BeO epitaxially grown on α -Ga₂O₃," *J. Alloys Compd.* (submitted in Oct. 2025).
8. N.-I. Kim, J. Lee, G. Seo, H. M. Lee, M. Aqib, A. Ali, M. Moradnia, S. Pouladi, J.-Y. Kim, M.-K. Kwon, J. Rho, and **J.-H. Ryou***, "Skin-attachable piezoelectric patch sensors for self-driven rehabilitation of stroke patients by simple game," *Adv. Healthc. Mater.* (submitted in Sep. 2025).

Accepted

9. D. Jung, Y. Jang, J. Bae, S. Han, H. Bong, N.-I. Kim, S. Choi, P. R. Sultane, C. W. Bielawski, **J.-H. Ryou**, and J. Oh, "Single-crystalline (0002) BeO film on (201) β -Ga₂O₃ substrate by epitaxial growth," *Appl. Surf. Sci.* (accepted in Dec. 2025).

Published

1. S. Kang, S. Noh, J. Shin, S. Jhee, N.-I. Kim, **J.-H. Ryou**, and J. S Kim, "Real-time monitoring of hand tremor and palmar hyperhidrosis using self-powered touch-free image sensor fabricated with semiconductor nanowires," *Chem. Eng. J.* **527**, 171964–1–9 (2026).
2. 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 Appl. Electron. Mater.* **7** (24), 10853–10859 (2025). [[Featured supplementary-cover article in issue 24 of volume 7 \(December 2025\)](#)]
3. 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 LiCoO₂ through tri-site co-doping with Al-Mg-F," *Small* **21** (5), 2409892–1–11 (2025).
4. 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).
5. 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- μ m AlN layer on Si substrate using ductile interlayer for strain modification in epitaxial film," *Appl. Phys. Lett.* **125** (11), 112104–1–6 (2024).
6. 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 \(June 2024\)](#)]
7. 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).
8. 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).
9. 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 \(March 2023\)](#)]
10. **J.-H. Ryou*** and S. Choi, "All-around diamond for cooling high-power devices," *Nat. Electron.* **5**, 834–835 (2022).
11. 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).

12. 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).
13. 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).
14. 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 \(April 2022\)\]](#) [\[Also featured in a special issue of Women Researchers at the Forefront of Crystal Engineering\]](#)
15. 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).
16. 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 \(February 2021\)\]](#)
17. W. Gu, Y. Lu, R. Lin, W. Guo, Z.-H. Zhang, **J.-H. Ryou**, J. Yan, J. Wang, J. Li, and X. Li, "BAIN for III-nitride UV light emitting diodes: Undoped electron blocking layer," *J. Phys. D: Appl. Phys.* **54** (17), 175104-1–9 (2021).
18. 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).
19. 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).
20. 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).
21. 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).
22. 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).
 23. 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).
 24. 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 AlGa_N/Ga_N 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 \(March 2020\)\]](#)
 25. 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).
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Conference Presentations (Peer Reviewed)

1. M. Aqib and **J.-H. Ryou***, "Crack-free single-crystalline ultrawide bandgap semiconductor film growth on silicon substrate for next-generation semiconductor applications in electronics, sensing, photonics, and energy harvesting," *Next-Generation Microelectronics and Interface Engineering for Integration*, Houston, Texas, Nov. 2025. [Best Poster Award]
2. N. Sutradhar, M. Aqib, and **J.-H. Ryou***, "Strain evolution and crack formation in III-N thin films: Insights into epitaxial growth dynamics," *Next-Generation Microelectronics and Interface Engineering for Integration*, Houston, Texas, Nov. 2025.

3. N.-I. Kim and **J.-H. Ryou***, “Single-crystalline flexible III-N thin film for physical sensing in personal healthcare monitoring,” *Next-Generation Microelectronics and Interface Engineering for Integration*, Houston, Texas, Nov. 2025.
4. A. Ali and **J.-H. Ryou***, “Acoustic wireless power transfer system for integrated healthcare devices based on biocompatible III-N piezoelectric materials,” *Next-Generation Microelectronics and Interface Engineering for Integration*, Houston, Texas, Nov. 2025.
5. *(Invited talk)* **J.-H. Ryou***, N.-I. Kim, A. Ali, M. Aqib, M. H. Ji, V. S. Parameshwaran, W. L. Sarney, M. S. Litz, and L. S. Larkin, “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.
6. S. Pouladi, Y. G. Lee, K. H. Lee, and **J.-H. Ryou***, “High-power 940nm n-p junction vertical-cavity surface-emitting laser arrays with tunnel junction,” *The 2025 Asia-Pacific Workshop on Advanced Semiconductor Devices (AWAD 2025)*, Nara, Japan, Jul. 2025.
7. N.-I. Kim, M. Aqib, Asad Ali, and **J.-H. Ryou***, “Highly flexible biocompatible III-N thin film piezoelectric sensors for monitoring of human skin deformation,” *The 2025 Asia-Pacific Workshop on Advanced Semiconductor Devices (AWAD 2025)*, Nara, Japan, Jul. 2025.
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10. 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.
11. 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.
12. 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.

13. *(Invited talk)* **J.-H. Ryou***, “Epitaxy on Anything Opportunities for Semiconductors,” *DARPA MEC (Microelectronics Committee) Epitaxy on Anything Workshop*, Santa Barbara, California, Jun. 2025.
14. 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.
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18. *(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.
19. 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.
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22. 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.

23. 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.
24. 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.
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29. *(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.
30. 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.
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 35. *(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.
 36. 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.
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 39. 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.
 40. *(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.
 41. S. Pouladi and **J.-H. Ryou***, “Effect of parasitic leakage currents associated with the regrown aperture of AlGaIn/GaN current aperture vertical electron transistors (CAVETs),” *The 7th IEEE Electron Devices Technology and Manufacturing (IEEE EDTM 2023)*, Seoul, Korea, Mar. 2023.
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 47. 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.
 48. 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.
 49. 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.
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 51. 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]**
 52. 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.
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56. 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.
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59. 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.
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61. 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.
62. 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.

63. 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.
64. 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.
65. *(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.
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69. *(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.
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71. 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.
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- Electronic and Photonic Microsystems (InterPACK)*, San Francisco, California, Aug. 2018.
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 75. 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.
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 78. 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.
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 80. 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.
 81. 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.

82. *(Invited talk)* S. C. Shen, R. D. Dupuis, T. Detchprohm, **J.-H. Ryou**, J. B. Chaityasarikul, 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.
83. **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.
84. *(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.
85. **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.
86. **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.
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88. 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.
89. 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.
90. 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.

91. 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.
92. 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]**
93. 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.
94. 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.
95. **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.
96. **(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.
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98. 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.
99. 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.
100. 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.
101. S. K. Oh, T. Jang, **J.-H. Ryou**, Y. J. Jo, H.-Y. Ko, and J. S. Kwak, “Significantly enhanced output power in AlGa_N/Ga_N HFETs with multi-layer metallization” (PS1), *The 58th Electronic Materials Conference (EMC 2016)*, Newark, Delaware, Jun. 2016.
 102. 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.
 103. 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.
 104. 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.
 105. 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.
 106. 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.
 107. X. Li, H. Xie, F. Ponce, **J.-H. Ryou**, T. Detchprohm, and R. D. Dupuis, “Onset of deep UV surface stimulated emission from AlGa_N multiple quantum wells”(JthA2.45), *Conference on Lasers and Electro-Optics: Applications and Technology 2016 (CLEO 2016)*, San Jose, California, Jun. 2016.
 108. 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.
 109. 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.
 110. *(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.
111. *(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.
 112. 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.
 113. 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.
 114. 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.
 115. 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.
 116. 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.
 117. 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.
 118. *(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.
 119. 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.
 120. 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.
 121. 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.
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R&D Projects and Grants (As PI or Co-PI)

Principal Investigator (PI)

1. Multifunctional Materials and Devices for Advanced Photonic, Electronic, Energy, and Sensing Applications, PI, Sep. 2025 – Aug. 2026, UH, Texas Center for Superconductivity at the University of Houston (TcSUH).
2. 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.
3. 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).
4. 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).
5. 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).
6. 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).
7. Design of Near IR Light Sources, UH, PI, Dec. 2020 – Nov. 2021, Hana Optronics.
8. 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).
9. Design of VCSELs, UH, PI, Jan. 2020 – Dec. 2020, Hana Optronics.
10. 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).
11. 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).
12. I-CORPS: Flexible and Bendable Electronic and Photonic Device Platform, PI, Dec. 2018 – May 2019, UH, National Science Foundation (NSF), ENG/IIP.
13. 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.

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

Co-Principal Investigator (Co-PI)

1. Development of Semiconductor Education Program for Awareness and Workforce Training for Students in Houston Area (SEP-Houston), Co-PI, Jan. 2026 – Dec. 2026, UH, NSF National Network for Microelectronics Education (NNME) via South Semiconductor Alliance.

2. Development of Laser semiconductor heater module for the dryer electrode coating process, Co-PI, Jul. 2025 – Dec. 2027, Korea Evaluation Institute of Industrial Technology (KEIT) via Hana Optronics.
3. Next-Generation Microelectronics Manufacturing Center, Jul. 2024 – Jul 2029, DARPA via UT Texas Electronics Institute.
4. AI Applications in Energy Storage and Harvesting, Co-PI, Mar. 2024 – Dec/ 2024, UH Seed Grant.
5. 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) via Hana Optronics.
6. Development of epitaxial materials and devices for vertical GaN power electronics, Co-PI, Jul. 2022 – Dec. 2026, Korea Evaluation Institute of Industrial Technology (KEIT) via Electronics and Telecommunication Research Institute (ETRI).
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) via Hana Electronics.
8. MRSEC: Houston Center for Advanced Materials and Manufacturing (H-CAMM), Co-PI, Mar. 2022 – Dec. 2022, UH National Center Proposal Grant (NCPG).
9. Investigation of Controlled Bending Strain in Deep UV LED Efficiency, Co-PI, Apr. 2017 – Mar. 2021, King Abdallah University of Science and Technology (KAUST).
10. Physical Property Measurement System, Co-PI, Aug. 2015 – Aug. 2016, Office of Naval Research (ONR), DURIP Program.
11. 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).
12. Advanced Middle-UV Coherent Optical Sources, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), CMUVT program.
13. Fundamental Study of Defect Reduction in Type-II Superlattice Materials, Co-PI, 2010 – 2012, Georgia Tech, Army Research Office (ARO), MURI.
14. Collaborative Research: Nanobeam Lasers, Co-PI, 2010 – 2012, Georgia Tech, National Science Foundation (NSF), ECCS.
15. 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.
16. Development of Nitride Electronic Next Generation Technology, Co-PI, 2010 – 2012, Georgia Tech, Defense Advanced Projects Agency (DARPA), NeXT program, subcontract from HRL.
17. E-Mode III-Nitride High-Voltage Transistor Development, Co-PI, 2009 – 2012, Georgia Tech, Intersil Corp.

18. 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.
19. 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.
20. 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).
21. Novel High-Performance III-N HBTs for Next-Generation Energy-Efficiency Systems, Co-PI, 2007 – 2011, Georgia Tech, National Science Foundation (NSF), ECCS.
22. Development of High-Efficiency InGaN-Based Green Lasers, Co-PI, 2007 – 2010, Georgia Tech, Defense Advanced Projects Agency (DARPA), VIGIL program.
23. 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

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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 **10897120** (Jan. 19, 2021).
3. **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).
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5. **Jae-Hyun Ryou**, “Flexible single-crystalline semiconductor device fabrication and methods of thereof,” US Patent **9831273** (Nov. 27, 2017).
6. 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).
7. 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).

8. 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).
9. **Jae-Hyun Ryou** and Gyoungwon Park, “Dielectric VCSEL gain guide,” US Patent **7277461** (Oct. 2, 2007).
10. **Jae-Hyun Ryou**, “Pseudomorphic layer in tunnel junction,” US Patent **7136406** (Nov. 14, 2006).
11. **Jae-Hyun Ryou**, Michael D. Ringle, and Yue Liu, “VCSEL having thermal management,” US Patent **7075962** (Jul. 11, 2006).
12. **Jae-Hyun Ryou**, Tzu-Yu Wang, Jin K. Kim, Gyoungwon Park, and Hoki Kwon, “Enhanced lateral oxidation,” US Patent **7054345** (May 30, 2006).
13. 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).

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3. **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).
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5. **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)).

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III-nitride semiconductor films and methods of making the same,” (submitted to UH OIPM in Oct. 2025).

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. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, “High-Speed Direct Modulation of VCSELs I: Fundamentals and Strategies,” Nov. 2025.
2. **Air Force Research Laboratory**, Wright-Patterson AFB, Ohio, “New Wide- and Ultrawide-Bandgap Semiconductor Materials, Heterostructures, and Devices: AlN on Si, BeO, Flexible Harsh-Environment and Personal-Healthcare Sensors, Energy Harvesters, etc. (But No Conventional HEMTs, FETs, LEDs, PDs),” Jul. 2025.
3. **Jeonbuk National University**, G-LAMP, Jeonju, Korea, “Emerging Ultrawide-Bandgap Semiconductors for Electronics, Photonics, Energy, and Sensing,” Feb. 2025.
4. **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.
5. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, “Self-Mixing Interferometry Using Vertical-Cavity Surface-Emitting Lasers II: Modeling and Applications,” Oct. 2024.
6. **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.
7. **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.
8. **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.
9. **Korea Photonics Technology Institute (KOPTI)**, Gwangju, Korea, “Self-Mixing Interferometry Using Vertical-Cavity Surface-Emitting Lasers: Fundamentals and Applications,” Jul. 2024.
10. **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.
11. **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.
 12. **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.
 13. **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.
 14. **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.
 15. **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.
 16. **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.
 17. **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.
 18. **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.
 19. **Sungkyunkwan University**, Department of Energy Science, Suwon, Korea, “Multifunctional Flexible Semiconductor Materials and Devices for Energy, Photonic, Electronic, and Sensing Applications,” Mar. 2021.
 20. **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.
 21. **Hana Optronics**, Asan, Korea, “Device Physics of VCSELs,” Aug. 2020.

22. **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.
23. **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.
24. **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.
25. **Korea University**, Department of Chemical Engineering, Seoul, Korea, “Multifunctional flexible semiconductor materials and devices for photonic, electronic, and energy applications,” Jan. 2019.
26. **Korea Institute of Ceramic Engineering and Technology (KICET)**, Jinju, Korea, “Multifunctional flexible semiconductor materials and devices for photonic, electronic, and energy applications,” Jan. 2019.
27. **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.
28. **Korea Photonics Research Institute (KOPTI)**, Gwangju, Korea, “Semiconductor materials and devices for photonic, electronic, and energy applications,” Dec. 2018.
29. **LG Innotek**, Paju, Korea, “Semiconductor materials and devices for photonic, electronic, and energy applications,” Dec. 2018.
30. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, “High-performance multifunctional flexible semiconductor materials and devices,” Jan. 2018.
31. **Korea Photonics Research Institute (KOPTI)**, Gwangju, Korea, “High-performance multifunctional flexible semiconductor materials and devices,” Jan. 2018.
32. **Hanyang University**, Department of Materials Science and Engineering, Seoul, Korea, “High-performance multifunctional flexible semiconductor materials and devices,” Dec. 2017.
33. **LG Innotek**, Paju, Korea, “Fundamentals of vertical-cavity surface emitting lasers,” Sep. 2017.
34. **Korea Electronics Technology Institute**, Seongnam, Korea, “High-performance multifunctional flexible semiconductor devices,” Sep. 2017.
35. **LG Innotek**, Paju, Korea, “Fundamentals of semiconductor laser diodes,” May 2017.

36. **LG Electronics**, Materials & Devices Advanced Research Institute, Seoul, Korea, “Metalorganic chemical vapor deposition of III-V compound semiconductors,” May 2017.
37. **Samsung Advanced Institute of Technology**, Suwon, Korea, “High-performance flexible electronics based on single-crystal-like semiconductor thin films,” May 2017.
38. **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.
39. **Korea Polytechnic University**, Department of Nano-Optical Engineering, Siheung, Korea, “New functional semiconductor materials and electronic devices,” Aug. 2016.
40. **Seoul VIOSYS Co., Ltd.**, Ansan, Korea, “New trend in III-N-based photonic devices,” Aug. 2016.
41. **Seoul National University**, School of Materials Science and Engineering, Seoul, Korea, “New functional semiconductor materials and electronic devices,” Aug. 2016.
42. **Pohang University of Science and Technology**, School of Materials Science and Engineering, Pohang, Korea, “New functional semiconductor materials and electronic devices,” Aug. 2016.
43. **Chonnam National University**, School of Materials Science and Engineering, Gwangju, Korea, “New functional semiconductor materials and electronic devices,” May 2016.
44. **SungKyunkwan University**, Department of Energy Science, Suwon, Korea, “Semiconductor materials for energy science and applications,” Feb. 2016.
45. **Hongik University**, School of Electronic and Electrical Engineering, Seoul, Korea, “New functional semiconductor materials and electronic devices,” Nov. 2015.
46. **National Oilwell Varco**, Houston, Texas, “Active materials and devices based on semiconductors,” Nov. 2015.
47. **Sunchon National University**, Department of Printed Electronics Engineering, Sunchon, Korea, “New functional semiconductor materials and devices,” Oct. 2015.
48. **Applied Optoelectronics Inc.**, Sugar Land, Texas, “Metalorganic chemical vapor deposition, an introduction,” Sep. 2015.
49. **Georgia Institute of Technology**, School of Electrical and Computer Engineering, Atlanta, Georgia, “New functional semiconductor materials and devices,” Jul. 2015.
50. **Korea Institute of Science and Technology (KIST)**, Post-Silicon Semiconductor Institute, Seoul, Korea, “New functional semiconductor materials and devices,” May 2015.
51. **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.

52. **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.
53. **Yonsei University**, School of Integrated Technology, Incheon, Korea, “Historical perspectives of semiconductor technology development and new functional semiconductor materials and devices,” May 2015.
54. **Yonsei University**, School of Materials Science and Engineering, Seoul, Korea, “New functional semiconductor materials and devices,” May 2015.
55. **SungKyunKwan University**, Graduate Program of Energy System Engineering, Suwon, Korea, “Energy-saving semiconductor materials and devices,” Feb. 2015.
56. **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.
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62. **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.
63. **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.
64. **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.
65. **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.

66. **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.
67. **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.
68. **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.
69. **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.
70. **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.
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1. Deborah Borfitz, “Psst! Need a Simple and Reliable Eye Tracker for Your Brain Studies?” *Clinical Research News*, October 15, 2024.
<https://www.clinicalresearchnews.com/news/2024/10/15/psst!-need-a-simple-and-reliable-eye-tracker-for-your-brain-studies>
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<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 at UH

1. N.-I. Kim and **J.-H. Ryou**, “Flexible piezoelectric III-N thin-film based wearable/skin-attachable sensors for bio-physical and bio-chemical applications,” *The Post-Doctoral Research Symposium*, University of Houston, Houston, Texas, May 2025.
2. 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.
3. 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)]

4. 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.
5. 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)]**
6. 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.
7. 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.
8. 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)]**
9. 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.
10. 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)]**
11. 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.
12. 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.
13. 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.

14. 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 \(3rd Place\)](#)]
15. 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.
16. 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 \(2nd Place\)](#)]
17. 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.
18. 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.
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20. 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.
21. 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.
22. 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.
23. 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 “Semiconductor 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
2025 Spring	MECE 6361-01 / 02 / 03	4.46 / 4.86 / NA	0.95 / 1.05 / NA
2025 Spring	MECE 5397-08	4.83	1.11
2025 Fall	MECE 3345-1	4.19	0.99
2026 Spring	MECE 6361-01 / 02 / 03		

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. Aniroodh Sivaraman (UH, Materials Science and Engineering, Ph.D. student, Fall 2024 – Spring 2025.
3. Asad Ali (UH, Mechanical Engineering, Ph.D. candidate), Fall 2022 – present.
4. Muhammad Aqib (UH, Mechanical Engineering, Ph.D.), Spring 2022 – Fall 2025, Dissertation: *Crack-Free Single-Crystalline Ultrawide Bandgap Semiconductor Film Growth on Silicon Substrate for Next-Generation Semiconductor Applications in Electronics, Sensing, Photonics, and Energy Harvesting*. Currently with Texas Instruments
5. 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
6. 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.
7. 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.
8. 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.

9. 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.
10. 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.
11. 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.
12. 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. Augusto Molina (UH, Electrical and Computer Engineering, M.S.): Fall 2025 – present.
2. 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.
3. 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.
4. 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.
5. 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.
6. Bharath Dixit (UH, Materials Science and Engineering, M.S.): Summer 2015 – Fall 2016. Currently with ADVANTEST.

7. 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 Sejong University), Sep 2022 – Sep. 2025.
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. Ryan Nguyen (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2025 – present.
2. Arunabh Sarmah (UH, Mechanical Engineering, undergraduate research assistant), Jan. 2024 – Dec. 2024.
3. Roberto Morales (UH, Mechanical Engineering, undergraduate research assistant), Jun. 2023 – Dec. 2023.
4. Sean Bruzdoski (UH, Mechanical Engineering, undergraduate research assistant), Jun. 2022 – May 2023.
5. Kyle Le (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2020 – Dec. 2021.

6. Ogynan Stefanov (UH, Mechanical Engineering (from University of California, Berkeley), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2019 – Aug. 2019.
7. Tanner Barbee (UH, Mechanical Engineering), Jan. 2019 – Dec. 2019.
8. Heidi Johnson (UH, Mechanical Engineering (from Bingham Young University), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2018 – Aug. 2018.
9. Noor Nabulsi (UH, Mechanical Engineering, undergraduate research student, Provost's Undergraduate Research Scholarship (PURS) program), May 2017 – Jun. 2019.
10. 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.
11. Yang (Colby) Huai (UH, Mechanical Engineering, undergraduate research student, Senior Honor Thesis), Sep. 2016 – Dec. 2017, Thesis: Optimization of InAlGa_N/Ga_N HEMT Device.
12. John Lee (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Sep. 2015 – Apr. 2016.
13. Mitchell Baxendale (UH, Mechanical Engineering (from Georgia Institute of Technology), undergraduate research assistant, NSF Research Experiences for Undergraduates (REU) program), May 2015 – Aug. 2015.
14. Jereomy Lopez (UH, Mechanical Engineering, undergraduate research assistant, Provost's Undergraduate Research Scholarship (PURS) program), Jan. 2015 – Jun. 2015.
15. Esther Kim (Georgia Tech, Electrical and Computer Engineering, undergraduate research assistant), 2010 – 2011.
16. Carson A. Wick (Georgia Tech, Electrical and Computer Engineering, PURA (presidential undergraduate research award) program), 2007.
17. 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: Flexible Electronics and Biosensors, *EMC 2025 (The 67th Electronic Materials Conference)*, Durham, North Carolina, Jun. 2025.
2. Session H: Wearable Electronics and Biosensors, *EMC 2024 (The 66th Electronic Materials Conference)*, College Park, Maryland, Jun. 2024.
3. Session H: 2D Materials, Devices and Sensors, *EMC 2023 (The 65th Electronic Materials Conference)*, Santa Barbara, California, Jun. 2023.
4. 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.
5. Session JJ: Printed and Flexible Thin Films, *EMC 2021 (The 63rd Electronic Materials Conference)*, Virtual Conference, Jun. 2021.
6. Session RR: Flexible, Printed and/or Dissolvable Thin Films or Nanomembranes, *EMC 2020 (The 62nd Electronic Materials Conference)*, Columbus, Ohio, Jun. 2020.
7. 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.
8. 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.
9. 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.
10. Session X: III-Nitride Materials for Power Electronics, *EMC 2019 (The 61st Electronic Materials Conference)*, Ann Arbor, Michigan, Jun. 2019.
11. 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.
12. EEC Session: Optics/Optoelectronics, *UKC 2017 (The US-KOREA Conference on Science, Technology and Entrepreneurship 2017)*, Washington DC, Aug. 2017.
13. 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.
14. Session FF: III-Nitride Detectors, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
 15. Session O: III-Nitride Defects and Characterization, *EMC 2016 (The 58th Electronic Materials Conference)*, Newark, Delaware, Jun. 2016.
 16. 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.
 17. Session MOA2: 07. Luminescence Properties, *APWS 2015 (The 7th Asia-Pacific Workshop on Widegap Semiconductors)*, Seoul, Korea, May 2015.
 18. Session TB1: Nanoepitaxy for Novel LEDs II, *WLED-5 (The 5th International Conference on White LEDs and Solid State Lighting)*, Jeju, Korea, Jun. 2014.
 19. Session G: Epitaxy and Characterization of InN, *ISGN-5 (The 5th International Symposium on Growth of III-Nitrides)*, Atlanta, Georgia, May 2014.
 20. Session A3: Optical Structure and Measurements, *ICNS-10 (The 10th International Conference on Nitride Semiconductors)*, Washington, D.C., Aug. 2013.
 21. Session Q: HEMTS: Defects and Reliability, *EMC 2013 (The 55th Electronic Materials Conference)*, Norte Dame, Indiana, Jun. 2013.
 22. 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.
 23. Session GG: III-Nitrides: Non-Polar and Semi-Polar Devices, *EMC 2011 (The 53rd Electronic Materials Conference)*, Santa Barbara, California, Jun. 2011.
 24. Session JJ: Nonpolar-Semipolar III-Ns, *EMC 2010 (The 52nd Electronic Materials Conference)*, Notre Dame, Indiana, Jun. 2010.
 25. Session F: Group III Nitride Photodetectors and Photonic Lattices, *EMC 2008 (The 50th Electronic Materials Conference)*, Santa Barbara, California, Jun. 2008.
 26. Session B: Microwave Devices, *ICNS-7 (The 7th International Conference on Nitride Semiconductors)*, Las Vegas, Nevada, Sep. 2007.
 27. 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. Judge, *The 60th TcSUH Student Symposium*, University of Houston, Houston, Texas, May 2, 2025.
2. Chair, *The 59th TcSUH Student Symposium*, University of Houston, Houston, Texas, Apr. 26, 2024.
3. Judge, *The 56th TcSUH Student Symposium*, University of Houston, Houston, Texas, Apr. 30, 2019.
4. Judge, *The 55th TcSUH Student Symposium*, University of Houston, Houston, Texas, May 1, 2018.
5. Judge, *MRS UH Chapter Student Symposium 2018*, University of Houston, Houston, Texas, Sep. 13, 2018.
6. Judge, *MRS UH Chapter Student Symposium 2017*, University of Houston, Houston, Texas, Apr. 5, 2017.
7. 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.
8. 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.
9. UH TcSUH representative, *Energy Day Houston 2015*, Sam Houston Park, Houston, Texas, Oct. 17, 2015.
10. 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.
11. UH Energy representative, *Earth Day Houston 2015*, Discovery Green, Apr. 11, 2015.
12. Judge, *University of Houston 2014-2015 Mars Rover Celebration*, Hilton University of Houston, Houston, Texas, Jan. 31, 2015.
13. UH TcSUH representative, *Energy Day Houston 2014*, Sam Houston Park, Houston, Texas, Oct. 18, 2014.
14. Judge, *Science and Engineering Fair of Houston (SEFH)*, George R. Brown Convention Center, Houston, Texas, Feb. 20, 2014.
15. 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 Chair, Quantum Materials and Device Presidential Frontier Faculty (PFF) Search Committee, Fall 2025 – Spring 2026.
2. Committee Member, Theoretical Quantum Physics and Artificial Intelligence Presidential Frontier Faculty (PFF) Search Committee, Fall 2025 – Spring 2026.
3. Committee Member, Materials Science and Engineering Ph.D. Dissertation Award Committee, Fall 2025.
4. Committee Chair, Materials Group Qualifying Exam Committee, Spring 2025.
5. Committee Member, Mechanical Engineering Ph.D. Dissertation Award Committee, Fall 2024.
6. Committee Chair, Materials Group Qualifying Exam Committee, Spring 2024.
7. Committee Chair, Materials Group Faculty Search Committee, Fall 2023 – Spring 2024.
8. Committee Chair, Quantum Materials Presidential Frontier Faculty (PFF) Search Committee, Fall 2023 – Spring 2024.
9. Committee Member, Physics Quantum Materials Presidential Frontier Faculty (PFF) Search Committee, Fall 2023 – Spring 2024.
10. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2022.
11. Committee Chair, Materials Group Faculty Search Committee, Fall 2022 – Spring 2023.
12. Committee Chair, Materials Group Faculty Search Committee, Fall 2021 – Spring 2022.
13. Committee Chair, Materials Group Qualifying Exam Committee, Spring 2021.
14. Committee Chair, ABET Certificate Preparation Committee, Spring 2021 – Fall 2022.
15. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2020.

16. Committee Chair, Materials Group Faculty Search Committee, Fall 2020 – Spring 2021.
17. Director, Corrosion Engineering Certificate Program, Aug. 2020 – Aug. 2021
18. Committee Member, Materials Group Qualifying Exam Committee, Fall 2019.
19. Committee Chair, Materials Group Faculty Search Committee, Fall 2019 – Spring 2020.
20. Committee Chair, Materials Group Qualifying Exam Committee, Fall 2018.
21. Undergraduate Advisor, Fall 2018, Spring 2019, Fall 2019, Spring 2020.
22. Committee Member, Graduate Program Reform Committee, Aug. 2018.
23. Committee Member, Materials Group Qualifying Exam Committee, Spring 2017.

Cullen College of Engineering, University of Houston

1. Director, Semiconductor Engineering and Manufacturing Certificate Program, Aug. 2025 – present
2. Committee Member, Cullen College of Engineering Ph.D. Dissertation Award Committee, Fall 2025.
3. Committee Member, Effective Instruction Committee, 2025
4. Committee Member, Effective Instruction Committee, 2024
5. 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.