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WORK EXPERIENCES

Postdoctoral Fellow Energy Research Park (ERP), University of Houston, USA **2017-Present**

EDUCATION

Ph.D. **Materials Science and Engineering**, University of Houston, USA
2013-2017 Topic: Flexible III-Nitride-Based Materials and Devices for Electronic and Photonic Applications

Ph.D. candidate **Electrical and Computer Engineering**, University of Missouri-Columbia, USA
2012-2013⁺ Topic: Graphene growth and characterization
(*Transferred)

M.Sc. **Materials Science and Engineering**, Sharif University of Technology, Iran
2006-2009 Topic: Carbon nanotubes: synthesis and characterization

B.Sc. **Materials Science and Engineering**, Isfahan University of Technology, Iran
2001-2006 Topic: Hot corrosion of steel

ADDITIONAL WORK EXPERIENCES

Graduate Teaching Assistant, ME Department, University of Houston **2013-2015**

Engineer, Oil Department of RIVATADBIR Co. (Engineering Trading Company) **2010-2011**

PUBLICATIONS

Published:

1. S. K. Oh, M. U. Cho, D. G. Lee, T Jang, S. Pouladi, J. Chen, W. Wang, **Sh. Shervin**, S. Shin, S. Choi, J. S. Kwak, and J.-H. Ryou, "High-power flexible AlGaIn/GaN heterostructure field-effect transistors with negative differential conductivity suppression", *Applied Physics Letters* 111, 133502 (2017).
2. W. Wang, **Sh. Shervin**, S.-K. Oh, J. Chen, H. Kim, S.-N. Lee, J.-H. Ryou, "Numerical simulation of bent InAlN/GaN heterostructures for high-hole-mobility transistors", *IEEE Electron Device Letters* 38 (8), 1086-1089 (2017).
3. S. Singh, M. Yarali, **Sh. Shervin**, V. Venkateswaran, K. Olenick, J. A. Olenick, J.-H. Ryou, A. Mavrokefalos, "Temperature-dependent thermal conductivity of flexible yttria-stabilized zirconia substrate via 3 ω technique", *Physica Status Solidi A*, 1700069 (2017).
4. M. Asadirad, S. Pouladi, **Sh. Shervin**, J.-H. Ryou, "Numerical simulation for operation of flexible thin-film transistors with bending", *IEEE Electron Device Letters* 38 (2), 217-220 (2017).

5. H. Brahmi, S. Ravipati, M. Yarali, **Sh. Shervin**, W. Wang, J.-H. Ryou, A. Mavrokefalos, “Electrical and optical properties of sub-10nm nickel silicide films for silicon solar cells”, *Journal of Physics D: Applied Physics* 50 (3), 035102-1–10 (2017).
6. **Sh. Shervin**, S.-H. Kim, M. Asadirad, S.Yu. Karpov, D. Zimina, J.-H. Ryou, “Bendable III-N visible light-emitting diodes beyond mechanical flexibility: Theoretical study on quantum efficiency improvement and color tunability by external strain”, *ACS Photonics* 3 (3), 486–493 (2016). **[Featured cover article in issue 3 of volume 3 (March, 2016)]**
7. Y. Gao, M. Asadirad, Y. Yao, P. Dutta, E. Galstyan, **Sh. Shervin**, K.-H. Lee, S. Pouladi, S. Sun, M. Rathi, J.-H. Ryou, V. Selvamanickam, “High-performance flexible thin-film transistors based on single-crystal-like silicon on metal tape by roll-to-roll continuous deposition process”, *ACS Applied Materials & Interfaces* 8 (43), 29565–29572 (2016).
8. S.-H. Kim, S. Singh, S.-K. Oh, D.-K. Lee, K.-H. Lee, **Sh. Shervin**, M. Asadirad, V. Venkateswaran, K. Olenick, J. Olenick, S.-N. Lee, J.-S. Kwak, A. Mavrokefalos, J.-H. Ryou, “Visible Flip-Chip Light-Emitting Diodes on Flexible Ceramic Substrate with Improved Thermal Management”, *IEEE Electron Device Letters* 37 (5), 615–617 (2016).
9. K.-H. Lee, M. Asadirad, **Sh. Shervin**, S.-K. Oh, J.-K. Oh, J.-O. Song, Y.-T. Moon, J.-H. Ryou, “Thin-film-flip-chip LEDs grown on Si substrate using wafer-level chip-scale package”, *IEEE Photonics Technology Letters* 28 (18), 1956–1959 (2016).
10. S.-H. Kim, K.-H. Lee, H. -J. Park, **Sh. Shervin**, M. Asadirad, S.-N. Lee, J. S. Kwak, J.-H. Ryou, “Patterned Ga₂O₃ for current blocking and optical scattering in visible light-emitting diodes”, *Physica Status Solidi A* 213 (10), 2769–2772 (2016).
11. M. Asadirad, Y. Gao, P. Dutta, **Sh. Shervin**, S. Sun, S. Ravipati, S.-H. Kim, Y. Yao, K.-H. Lee, A. P. Litvinchuk, V. Selvamanickam, J. Ryou, “High-performance flexible thin-film transistors based on single-crystal-like germanium on glass”, *Advanced Electronic Materials* 2 (8), 1600041-1–7 (2016). **[Featured frontispiece article in issue 8 of volume 2 (August, 2016)]**
12. J. Kim, M.-H. Ji, T. Detchprohm, R. D. Dupuis, **Sh. Shervin**, J.-H. Ryou, “Effect of lattice-matched InAlGa_N electron-blocking layer on hole transport and distribution in InGa_N/Ga_N multiple quantum wells of visible light-emitting diodes”, *Physica Status Solidi A* 213 (5), 1296–1301 (2016).
13. **Sh. Shervin**, S.-H. Kim, M. Asadirad, S. Ravipati, K.-H. Lee, K. Bulashevich, J.-H. Ryou, “Strain-effect transistors: Theoretical study on the effects of external strain on III-nitride high-electron-mobility transistors on flexible substrates”, *Applied Physics Letters* 107 (19), 193504-1–5 (2015).
14. **Sh. Shervin**, S. Gheyhani, A. Simchi, “Formation of Carbon Nanotubes in Iron-Catalyzed Liquid Arcing Method: Effect of Iron-Ion Charge in the Aqueous Medium”, *International Journal of Modern Physics B* 25 (32), 4411-4417 (2011).
15. S. Gheyhani, **Sh. Shervin**, A. Simchi, “On the Formation of SWCNTs and MWCNTs by Arc-Discharge in Aqueous Solutions: The Role of Iron Charge and Counter Ions”, *Fullerene Nanotubes Carbon Nanostructures* 19 (4), 317-328 (2011).
16. **Sh. Shervin**, S. Gheyhani, A. Simchi, “Effect of Fe⁺³ concentration on the MWCNTs formation in liquid arcing method”, *Physica B* 405 (20), 4344-4349 (2010).

Submitted/ Under Review:

17. **Sh. Shervin**, S. K. Oh, H. J. Park, K.-H. Lee, M. Asadirad, S.-H. Kim, J. Kim, S. Pouladi, S. -N. Lee, X. Li, J. S. Kwak, J.-H. Ryou, “Flexible deep-ultraviolet light-emitting diodes for significant improvement of quantum efficiencies by external bending”, to be submitted to *Advance Optical Materials*.

18. S. Pouladi, M. Rathi, M. Asadirad, S. K. Oh, Y. Yao, P. Dutta, **Sh. Shervin**, K. H. Lee, Y. Gao, S. Sun, V. Selvamanickam, and J.-H. Ryou, “Flexible III-V thin-film photovoltaic solar cells with conversion efficiency close to 10% based on single-crystal-like thin-film directly grown on metallic tapes”, to be submitted to *Nature Photonics*.
19. S. M. Lee, J. H. Yum, S. Yoon, E. S. Larsen, W. C. Lee, S. K. Kim, **Sh. Shervin**, W. Wang, J.-H. Ryou, C. W. Bielawski, J. Oh, “Atomic layer deposition of single-crystalline BeO epitaxially grown on GaN substrates”, submitted to *ACS Applied Materials & Interfaces*.

PATENTS

1. J.-H. Ryou, J. Chen, S.-K. Oh, **Sh. Shervin**, “III-nitride thin-film-based piezoelectric generators and methods of making thereof”, invention disclosure (UHID: 2017-059), filed in June 2017
2. J.-H. Ryou, **Sh. Shervin**, and S.-H. Kim, “Externally-strain-engineered semiconductor photonic and electronic devices and methods of making thereof and assemblies thereof”, patent application filed to US PTO in April 2016 (UHID: 2015-033; Application #: PCT/US2016/026707, Doc #: 2483-07001) URL: <https://encrypted.google.com/patents/WO2016164765A1?cl=en>
3. **Sh. Shervin** and J.-H. Ryou, “Flexible single-crystal semiconductor heterostructures by direct growth and methods of making thereof”, file as provisional patent application to US PTO in September 2016 (UHID 2016-048; Application #: 62/393165026707; Doc #: 2483-08600)
4. **Sh. Shervin** and S. Gheyhani, “Effect Iron catalyst on carbon nanotube synthesis by aqueous arc discharge and methods of making thereof”, Iran Patent (Patent No. 58632, Licensed in May 2009)
5. S. Gheyhani and **Sh. Shervin**, “Carbon nanotube synthesis by arc discharge method and methods of making thereof”, Iran Patent (Patent No. 62579, Licensed in December 2009)

CONFERENCE PRESENTATIONS

1. **Sh. Shervin**, K. Alam, K. Shervin, J. Chen, S. H. Kim, T. H. Chung, S. Pouladi, R. Li, R. Forrest, J. Bao, J. H. Ryou, “Direct growth of single-crystal-like III-nitride thin films on copper foil”, 59th Electronic Material Conference (EMC) June 2017, Notre Dame, IN (**Accepted for oral presentation**)
2. **Sh. 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, J. H. Ryou, “Direct growth of single-crystal-like III-nitride structures on metal tape for flexible wide-bandgap semiconductor devices” (D2.3.12), International Workshop on Nitride Semiconductors (IWN) 2016, Orlando, FL (**Oral presentation**)
3. **Sh. Shervin** and J.-H. Ryou, “Direct growth of single-crystal-like III-nitride materials on metal tapes for flexible electronics and photonics”, 52nd Texas Center for Superconductivity at University of Houston Student Symposium 2016, (**Oral presentation**) – *Award winner*
4. **Sh. Shervin**, S. H. Kim, M. Asadirad, K. H. Lee, 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” (A2.4.04), International Workshop on Nitride Semiconductors (IWN) 2016, Orlando, FL (**Oral presentation**)
5. **Sh. Shervin**, S. H. Kim, M. Asadirad, K. H. Lee, J. H. Ryou, “Strain effect transistors: Theoretical study on the effect of external bending on III-nitride-based flexible high electron mobility transistors” (PS3), 58th Electronic Material Conference (EMC) 2016, Newark, NJ (**Poster presentation**)
6. **Sh. Shervin**, S. H. Kim, M. Asadirad, J. H. Ryou, “Polarization engineering in InGaN/GaN flexible light-emitting diodes: internal quantum efficiency improvement and peak emission wavelength tuning” (Q9), 57th Electronic Material Conference (EMC) 2015, Columbus, OH (**Oral presentation**)

7. **Sh. Shervin**, S.-H. Kim, M. Asadirad, J.-H. Ryou, “Effect of applying external strain on internal quantum efficiency and peak emission wavelength on flexible GaN-Based LEDs”, 49th Texas Center for Superconductivity at University of Houston Student Symposium 2015, (**Oral presentation**)
8. **Sh. Shervin**, S. Gheyhani, A. Simchi, “Investigation on the effect of iron concentration on the synthesis of carbon nanotubes via liquid-arc method in sulfate and chloride aqueous solutions”, 6th Nanotechnology Students Conference 2009, Tehran, Iran, (**Poster presentation**)
9. S. Gheyhani, **Sh. Shervin**, A. Simchi, “Raman spectroscopy study of multi-walled carbon nanotubes synthesized via arc discharge in aqueous solutions”, 3rd International Conference on Nanostructures (ICNS) 2010, Kish Island, Iran, (**Poster presentation**)

SELECTED PRESENTATIONS/ CO-AUTHORED

10. **J. H. Ryou**, **Sh. 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”, 21st American Conference on Crystal Growth and Epitaxy (ACCGE-21) July 2017, Santa Fe, NM (**Abstract submitted**)
11. **S. Pouladi**, M. Asadirad, M. Rathi, P. Dutta, Y. Yao, Y. Gao, **Sh. Shervin**, S. K. Oh, V. Selvamanickam, and J.-H. Ryou, “Low-cost flexible GaAs solar cells using single-crystal-like materials on metal tapes,” Materials Research Society (MRS) April 2017 Spring Meeting, Phoenix, AZ (**Oral presentation**)
12. **S. Pouladi**, M. Rathi, M. Asadirad, S. K. Oh, **Sh. Shervin**, D. Khatiwada, P. Dutta, K. H. Lee, Y. Yao, Y. Gao, S. Sun, V. Selvamanickam, J. H. Ryou, “Flexible GaAs Single-Junction Solar Cells Based on Single-Crystal-Like Thin-Film Materials Directly Grown on Metal Tapes”, 44th IEEE Photovoltaic Specialists Conference (PVSC) June 2017, Washington, DC (**Poster presentation**)
13. **J.-H. Ryou**, **Sh. 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, MD (**Invited talk**)
14. **Sh. Shervin**, S. H. Kim, M. Asadirad, K. H. Lee, **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 (**Oral presentation**)
15. **M. Asadirad**, M. Rathi, S. Pouladi, Y. Yao, P. Dutta, **Sh. Shervin**, K. H. Lee, N. Zheng, P. Ahrenkiel, V. Selvamanickam, J. H. Ryou, “III-V thin-film photovoltaic solar cells based on single-crystal-like GaAs grown on flexible metal tapes”, 43rd IEEE Photovoltaic Specialists Conference (PVSC 2016), 1954–1956 (2016). (**Conference proceedings**)
16. **J.-H. Ryou**, **Sh. 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), 14th International Union of Materials Research Societies-International Conference on Advanced Materials (IUMRS-ICAM) 2015, Jeju, Korea (**Invited talk**)
17. **Sh. Shervin**, S. H. Kim, M. Asadirad, **J. H. Ryou**, “Internal quantum efficiency improvement and peak emission wavelength tuning in flexible visible GaN-based light-emitting diodes” (MSE-12), 12th US-Korea Conference on Science, Technology, and Entrepreneurship (UKC) 2015, Atlanta, GA, (**Oral presentation**)
18. **J.-H. Ryou**, **Sh. 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 (**Invited talk**)
19. **S. Mukherjee**, **Sh. Shervin**, J. Mathai, O. Azizi, A. E. Boher, M. Tsirlin, G. Hubler and S. Gangopadhyay “Development of Pd incorporated SWCNT nanostructures for enhanced hydrogen loading”, 18th ICCF 2013, Columbia, MO, (**Oral presentation**)

HONORS/ AWARDS/ SCHOLARSHIPS

- **Best PhD Dissertation Award** in Materials Science and Engineering Program at University of Houston, Spring 2017
- **Association of Energy Engineers Scholarship** The AEE Foundation, 2017
- **Lone Star Chapter Scholarship** Association of Energy Engineers (AEE) Foundation, 2017
- **Oral Presentation Award**, 52nd Texas Center for Superconductivity at University of Houston (TcSUH) Student Symposium, 2016
- **Cullen Fellowship Travel Grant**, University of Houston, 2016
- Recognized by Cullen College of Engineering at University of Houston, 2016
URL: www.egr.uh.edu/news/201604/uh-engineers-make-journal-cover-flexible-led-theoretical-study
- **Featured publication** on the *cover photo of ACS Photonics* journal, March 2016 (3rd issue), 2016
- **Association of Energy Engineers Scholarship** The AEE Foundation, 2016
- **Bidani Award Scholarship**, University of Houston, 2015
- **Travel Award**, Texas Center for Superconductivity at the University of Houston, 2015
- **Nominee** of the Cullen College of Engineering's representor in the *Graduate Research and Scholarship Projects (GRaSP)*, Graduate School, University of Houston, 2015
- **Graduate Research Assistantship**, University of Houston, 2016-2017
- **Graduate Tuition Fellowship**, University of Houston, 2014-2017
- **Graduate Research Assistantship**, University of Missouri, 2012-2013
- **Research Grant** from the National Elite Foundation-Iran, 2010

REVIEWER OF TECHNICAL JOURNALS

- Optics Express, OSA
- IEEE Electron Device Letters, IEEE
- IEEE Photonics Journal, IEEE
- Applied Physics Letters, AIP
- Journal of Crystal Growth, Elsevier
- Journal of Physica Status Solidi (a), Wiley
- Crystal Growth & Design, ACS
- ACS Photonics, ACS

CERTIFICATIONS

- Graduate Research and Scholarship Projects (GRaSP) for Poster Presentation **October 2015**

PROFESSIONAL ASSOCIATIONS

- MRS (Materials Research Society) **Since 2016**
- IEEE (Institute of Electrical and Electronics Engineers) **Since 2016**
- OSA (Optical Society of America) **Since 2016**
- AEE (Association of Energy Engineers) local chapter - Lone Star **Since 2016**
- Honor Society **Since 2016**

RESEARCH EXPERIENCES

Doctoral Researcher, Energy Research Park (ERP), University of Houston, Texas

(Advisor – Dr. Jae-Hyun Ryou)

Research Projects

- Explored the growth of highly crystalline quality III-nitride (III-N) thin film on the rigid or flexible inorganic substrates for the electronic and photonic device fabrication by developing a multi-step deposition method to achieve highly crystalline films **(2013-2017)**
 - Provisional patent application to **US PTO** with a related topic is filed, Sept. 2016
 - *Oral presentation* at International Workshop on Nitride Semiconductor, IWN 2016
- Investigated the performance of the flexible III-N-based electronic and photonic devices and developed a new concept for electric and photonic devices through simulation studies; photo-electro-mechanical (PEM) device and strain-effect-transistors (SET), and Deep-ultra violet LEDs **(2013-2017)**
 - First authored manuscript published in ‘Applied Physics Letters’ 2015
 - First authored manuscript published in ‘ACS Photonics’ 2016
 - First authored manuscript submitted to ‘Applied Physics Letters’ 2017
 - Featured publication on the *cover photo of the ACS Photonics* Journal, March 2016
 - Filed official patent application to **US PTO** (Apr. 2016) with related topic
 - Disseminated results at ‘57th EMC 2015, Columbus-OH’, and ‘UKC 2015, Atlanta-GA’
 - Poster presentation at ‘58th EMC 2016, Newark-NJ’
 - *Oral presentation* at International Workshop on Nitride Semiconductor, IWN 2016
- III-V materials for Thin Film Transistors (TFTs) and Photovoltaic Solar Cells application on flexible substrates **(2014-2017)**
 - Co-authored manuscript published in ‘Advanced Electronic Materials’
 - Co-authored manuscript submitted to ‘ACS Applied Materials & Interfaces’
 - Featured publication in the *front piece of AEM* Journal, July 2017
 - Disseminated results at ‘57th EMC 2015, Columbus-OH’; 43rd IEEE-PVSC 2016, Portland, OR; and ‘58th EMC 2016, Newark-NJ’

Graduate Research Assistant, Center for Micro/Nano Systems and Nanotechnology, University of Missouri (Advisor – Dr. Shubhra Gangopadhyay)

Research Projects

- Investigated the growth of graphene via CVD method to grow large-area monolayer graphene and utilized Raman and SEM analyses to characterize graphene layer **(2012-2013)**
- Got involved in Palladium (Pd)/single walled carbon nanotube (SWCNT) nano-composite structures development through EPD for hydrogen storage applications **(2012-2013)**
 - Outcomes of research was presented at the ICCF-18 in 2013, Columbia, MO

Graduate Research Assistant, Center for Nanostructured & Advanced Materials, Sharif University of Technology (Advisor – Dr. Abdolreza Simchi)

Research Projects

- Investigated graphene growth on SiC substrate via ultra-high vacuum sublimation **(2011-2012)**
- Developed arc discharge method for synthesis of carbon nanotubes (CNTs), optimized CNTs synthesis parameters in aqueous solution to control the size and quality, and utilized TGA, TEM, SEM, and Raman analyses to characterize SWCNTs and MWCNTs **(2007-2010)**
 - First authored manuscript published in ‘Physica B’
 - First authored manuscript published in ‘International Journal of Modern Physics B’
 - Co-first authored manuscript published in ‘Fullerene Nanotubes Carbon Nanostructures’
 - Outcomes of research was presented at the ‘NS 2010, Kish Island-Iran’

ACTIVITIES/VOLUNTEER

- Energy and Earth day festivals held by the TcSUH in the University of Houston **2013-2016**
- Requirement Excellent Doctoral (RED) weekend held by the University of Houston **2013-2016**
- Welcome Weekend Orientation, Mechanical Engineering Department – University of Houston **2015**

TECHNICAL SKILLS

Overview:

- High-vacuum system; thin film deposition/growth; X-ray crystallographic characterization; materials characterization/analyses; semiconductor devices: Physics, design, and application; class 100 and 10 clean room experiences; nanomaterials synthesis and applications

Thin Film Deposition/Growth:

- DC/RF magnetron sputtering; CVD growth; e-beam evaporation; thermal oxidation; electrophoretic deposition; electroplating coating; Arc discharge deposition
 - Sputtering equipment super-user: Responsible for installation of parts, training users, vacuum trouble shooting, and maintenance

Materials Characterization/Analysis Techniques:

- X-ray analyses; D8-Bruker machine: HR- and powder- XRD, XRR, pole figures, RSM, GADDS
 - XRD equipment super-user: Responsible for training the users and maintaining the machine
- Optical; Raman spectroscopy, ellipsometry, UV-Vis, FTIR
- Surface/structure; SEM, AFM, TGA, optical profilometry, and zeta potential

REASERCH INTERESTS

- III-nitride materials for electronic and photonic devices such as visible- and deep UV- LEDs, HEMTs, Photodetectors and Lasers
- Thin film growth with different methods/ characterization techniques
- Semiconductor material for photovoltaic applications/ MEMS devices fabrication
- Synthesis and characterization of carbon nanomaterials such as CNTs and graphene
- Nanomaterials and nano-composites; Fabrication and processing techniques
- Application of Nano-/Advanced- materials in green energy and energy conversion
- Study the structure of materials using XRD or similar techniques

REFERENCES

- Available upon request