**Abbas Sabbar** afsabbar@uark.edu

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3200 SW Amberwood, Bentonville, AR, 72713

**EDUCATION**

**University of Arkansas at Fayetteville (UFA), Fayetteville AR**

* Ph.D., Electrical Engineering defended, July 2020
  + GPA: 3.85
* M.Sc., Electrical Engineering May 2020
  + GPA:4.0

**Kent State University, Kent Ohio**

* MA, physics Spring 2016
  + GPA:3.52

**University of Technology (UT), Baghdad, Iraq**

* M.Sc, Applied Physics Spring 2009
* Thesis: "Deposition and Study of Physical Properties of CuxS Thin Film Prepared by Chemical Bath Deposition"
* GPA:81.78/100
* B.Sc., Applied Physics Spring 2006
  + Rankings: 1/124 in Physics Department, 2nd  in entire university
  + GPA:87.0/100

**WORK EXPERIENCE**

* **Electrical Engineering, UAF**

**Research Assistant** 2017-2018, 2020

* Major achievements:

1. **Promoting Heterogeneous Integration Through Low-Voltage Silicon Carbide Circuits and Optical Isolation** 2019-Present

* Process development of SiC CMOS fabrication
* Design, development, and monolithic integration of optical devices in SiC technology
* Understand the process parameter optimization using TCAD simulation

1. **High Speed Electronic Devices Using SiGe on Sapphire Technology for Advanced NASA Space Communications** 2019-Present
   * Rhombohedral SiGe and other materials Growth using UHVCVD
   * SiGe material characterization
   * High Speed Device Development using SiGe on Sapphire
2. **Extreme Environment Integrated Circuits Using SiC JFET Technology for Advanced NASA Venus Missions** 2019-Presnt 
   * Process development of SiC JFET
   * Understand the process parameter optimization using TCAD simulation
3. **High-Temperature** **Optocoupler for 3D High-Density Power Modules** 2016-Present

* High temperature optical characterizations for different structures of LED materials.
* High temperature electrical characterizations for different commercial LEDs and photodetectors (PDs).
* Wavelength matching between the LED and PDs to form the HT optocoupler
* Skills developed: Leadership, collaboration, communication, time management

**Teaching Assistant** 2018-2019

* Major achievement: Lectured University Digital Design & Circuits II lab content.
* Skills developed: hands on experience to the electrical and physics lab tools, communication, fundamental knowledge understanding
* **Applied Physics, UT** 2008-2011

**Research Assistant**

* + Major achievements: Contributed to opening solid state laboratory for graduate and undergraduate students. Also, developed experiments in thermodynamic laboratory
  + Skills developed: Leadership, collaboration, communication, time management.
  + **Teaching Assistant**
  + Major achievements: Coordinator for Applied Physics Department. Also, assistant Lecturer of Thermodynamics

**TECHINCAL SKILLS**

* + Material grower using CVD, CBD, and SPS: Si, Ge, SiGe, GeSn, SiSn, SiGeSn, SiC
  + Characterization setup configuration: PL, Raman, EL, ellipsometry, I-V,Hall, & photodetector characterization.
  + Material/device processing: wet/dry etching, photolithography, thermal evaporation, PECVD, RIE, e-beam evaporation, sputtering, wire bonding.
  + Advanced Instruments: TEM, SEM
  + Software & Programming: LabVIEW, MATLAB, Silvaco, RSoft, TCAD, JMP, OriginLab.
  + Language: English, Arabic (native).

**PUBLICATIONS**

**Journals**

1. **A. Sabbar\*,** S. Madhusoodhanan, S. Al-Kabi, B. Dong, J. Wang, S. Atcitty, R. Kaplar, D. Ding, A. Mantooth, S. Yu, and Z. Chen, "Systematic Investigation of Spontaneous Emission Quantum Efficiency Drop up to 800K for Future Power Electronics Applications". In production at IEEE Journal of Emerging and Selected Topics in Power Electronics, Nov. 2018, DOI: <https://doi.org/10.1109/JESTPE.2018.2882775>
2. S. Madhusoodhanan, **A. Sabbar\***, S. Al-Kabi, S. Atcitty, R. Kaplar, B. Dong, J. Wang, S. Yu, Z. Chen "High-Temperature Optical Characterization of Wide Band Gap Light Emitting Diodes and Photodiodes for Future Power Module Application", Advances in Science, Technology and Engineering Systems Journal, vol. 4, no. 2, pp. 17-22 (2019), DOI: <http://dx.doi.org/10.25046/aj040203>
3. S. Madhusoodhanan**, A. Sabbar\***, S. Atcitty, R. Kaplar, A. Mantooth, S.-Q. Yu, and Z. Chen, "High-Temperature Analysis of GaN-based Blue LEDs for Future Power Electronic Applications," IEEE Journal of Emerging and Selected Topics in Power Electronics, pp. 1–1, 2019, DOI: <https://doi.org/10.1109/JESTPE.2019.2945166>
4. **A. Sabbar\***, S. Madhusoodhanan, S. Al-Kabi, B. Dong, J. Wang, S. Atcitty, R. Kaplar, D. Ding, A. Mantooth, S.-Q. Yu, and Z. Chen, "High Temperature and Power Dependent Photoluminescence Analysis on Commercial Lighting and Display LED Materials for Future Power Electronic Modules," Scientific Reports, vol. 9, no. 1, 2019, DOI: <https://doi.org/10.1038/s41598-019-52126-4>
5. S. Madhusoodhanan, **A. Sabbar**\*, S. Atcitty, R. Kaplar, A. Mantooth, S.-Q. Yu, and Z. Chen, "High-Temperature Optical Characterization of GaN-Based LEDs for Future Power Electronic Modules," physica status solidi (a), 2019, DOI: <https://doi.org/10.1002/pssa.201900792>
6. S. Madhusoodhanan, **A. Sabbar\***, H. Tran, B. Dong, J. Wang, A. Mantooth, S.-Q. Yu, and Z. Chen, "High-Temperature Analysis of GaN-based MQW Photodetector for Optical Galvanic Isolations in High-Density Integrated Power Modules," IEEE Journal of Emerging and Selected Topics in Power Electronics, pp. 1–1, 2020, DOI: <https://doi.org/10.1109/JESTPE.2020.2974788>
7. **A. Sabbar\***, S. Madhusoodhanan, B. Dong, J. Wang, A. Mantooth, S.-Q. Yu, and Z. Chen, "High-Temperature Spontaneous Emission Quantum Efficiency Analysis of Different InGaN MQWs for Future Power Electronics Applications," IEEE Journal of Emerging and Selected Topics in Power Electronics, May 2020. DOI: <https://doi.org/10.1109/JESTPE.2020.2995120>
8. **A. Sabbar\***, J. M. Grant, P. C. Grant, W. Dou, B. Alharthi, B0 Li, F. Yurtsever, S. A. Ghetmiri, M. Mortazavi, H. A. Naseem, S.-Q. Yu, A. Mosleh, and Z. Chen, " Growth and Characterization of SiGe on c-Plane Sapphire Using Chemical Vapor Deposition System", Journal of Electronic Materials, vol. 49, no. 8, pp. 4809- 4815, 2020. doi: <https://doi.org/10.1007/s11664-020-08169-9>
9. S. F. Banihashemian, J. M. Grant, **A. Sabbar\***, H. Tran, O. Olorunsola, S. Ojo, S. Amoah, M. Mehboudi, S.-Q. Yu, A. Mosleh, and H. A. Naseem, “ Growth and Characterization of Low-Temperature Si1-xSnx on Si using Plasma Enhanced Chemical Vapor Deposition System ”. In Optics Materials Express journal, accepted.
10. **A. Sabbar**\*, S. Madhusoodhanan, H. Tran, B. Dong, J. Wang, A. Mantooth, S.- Q. Yu\*, and Z. Chen\*, Wavelength Matching of Blue, Green, and Red LEDs for High-Temperature Optocouplers, to be submitted

**Conferences**

1. **A. Sabbar\***, S. Madhusoodhanan, S. Al-Kabi, B. Dong, J. Wang, S. Yu, and Z. Chen, "Investigation of High Temperature Photoluminescence Efficiency from InGaN/GaN MQWs," in Conference on Lasers and Electro-Optics, OSA Technical Digest (online) (Optical Society of America, 2018), paper JTh2A.79.
2. **A. Sabbar**\*, S. Madhusoodhanan\*, S. Al-Kabi, B. Dong, J. Wang, S. Atcitty, R. Kaplar, A. Mantooth, S. Yu, and Z. Chen, "High Temperature Photoluminescence of InGaN-Based MQWs on Patterned Sapphire Substrates," IEEE Photonics Conference (IPC), Reston, VA, 2018
3. S. Madhusoodhanan**, A. Sabbar\***, S. Al-Kabi, S. Atcitty, R. Kaplar, A. Mantooth, S-Q. Yu, and Z. Chen, "Temperature dependent optical characterization of GaN based LEDs for high temperature power electronic modules." 13th International Conference on Nitride Semiconductors 2019 (ICNS-13).
4. **A. Sabbar\*,** Joshua M. Grant,, Perry C. Grant, Wei Dou, , Aboozar Mosleh, Zhong Chen, Shui-Qing Yu,” SiGe Growth on a Sapphire Substrate Using UHV-CVD Technique,” ORAL presentation at the 61st Electronic Materials Conference (EMC2019), June 26-28, 2019; Ann Arbor, Michigan
5. **A. Sabbar\***, S. Madhusoodhanan, S. Al-Kabi, B. Dong, J. Wang, S. Atcitty, R. Kaplar, A. Mantooth, S. Yu, and Z. Chen, "High Temperature Spontaneous Emission Quantum Efficiency Analysis from Blue and Green LED Materials," IEEE Photonics Conference (IPC), San Antonio, TX, 2019
6. **A. Sabbar**\*, S. Madhusoodhanan, H. Tran, B. Dong, J. Wang, A. Mantooth, S. Yu, and Z. Chen, " Investigation of High Temperature LED and Photodetector from InGaN/GaN MQWs," in Conference on Lasers and Electro-Optics, OSA Technical Digest (online) (Optical Society of America, 2020), paper JTh2A.16.