

Cassandra Leah Remple

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Education

Materials Science and Engineering, Ph.D. GPA: 3.93	<i>Washington State University</i> Jul. 2019 – Jul. 2024
Chemical Engineering, B.S. Minor: Chemistry GPA: 3.49	<i>Oregon State University</i> Aug. 2013 – Dec. 2017

Research Experience

Ph.D. Candidate Optical Spectroscopy	<i>Washington State University</i> Jul. 2019 – Present
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- Extensive materials characterization via variable temperature photoluminescence (PL), Fourier-transform infrared (FTIR) spectroscopy, and Hall effect
- Investigated semiconductor surfaces via Raman and PL mapping using equipment accessed through collaboration with Klar Scientific, Inc.
- Restored a commercial chemical vapor deposition (CVD) system and initiated process development of multiple 2D semiconductors
- Lead the restoration, maintenance, and documentation of standard operating procedures for lab equipment

Undergraduate Research Assistant Clean Room Semiconductor Fabrication	<i>Oregon State University</i> Oct. 2016 – Aug. 2017
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- Clean room-housed semiconductor processing via multiple deposition, photolithography, and etching techniques
- Investigated the impact of metallic contact material on atomic layer deposition (ALD) high-*k* dielectric based device performance
- Performed current-voltage and capacitance-voltage electrical testing of capacitors and diodes

Johnson Scholar Internship Program Thin Film Photovoltaics	<i>Oregon State University</i> Jun. 2014 – Sep. 2015
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- Fabricated and characterized ZnS thin films using chemical solution deposition and micro-reactor assisted solution deposition
- Performed a mechanistic study on ZnS film growth for photovoltaic applications with in-situ characterization

Work Experience

Process Technician Electronic Device Development	<i>Amorphyx Inc.</i> Sep. 2017 – Jul. 2019
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- Developed and refined novel processes for device fabrication, testing, and characterization
- Developed device oxide breakdown reliability testing for LCD applications
- Fabricated quantum tunneling devices, amorphous metal nonlinear resistors (AMNRs), and thin film transistors (TFTs)
- Developed and performed electrical testing to characterize current-voltage and capacitance-voltage relationships of AMNRs, MIM Capacitors, diodes, and TFTs

Honors & Achievements

- Nominated for an Outstanding Student Award in the School of Mechanical and Materials Engineering - 2024
- 1st Place in Undergraduate Poster Competition, 2017 Pacific Northwest American Vacuum Society Conference
- Johnson Internship Awardee – 2014 and 2015
- Honor Roll at OSU – Winter 2014, Spring 2014, Spring 2015, and Summer 2015
- Semifinalist for OSU's Waldo-Cummings Outstanding Student Award – 2015

Skills

Processing	Characterization	Software/Languages
<ul style="list-style-type: none">▪ Atomic layer deposition▪ DC & RF magnetron sputtering▪ Photolithography▪ Plasma etching▪ Chemical etching▪ Reactive sputtering▪ Reactive ion etch▪ Chemical vapor deposition▪ Laser annealing/irradiating	<ul style="list-style-type: none">▪ Photoluminescence▪ Fourier transform infrared▪ Raman▪ Hall effect▪ UV-Vis▪ Atomic force microscopy (AFM)▪ Ellipsometry▪ Profilometry▪ SEM/EDS	<ul style="list-style-type: none">▪ Origin, Excel, JMP▪ Visio▪ Silvaco ATHENA and ATLAS▪ Aspen HYSYS
		Soft Skills
		<ul style="list-style-type: none">▪ Team leadership/Teaching▪ Written and oral presentations▪ Project management (cradle to grave)▪ Documentation of procedures

Peer Reviewed Publications

- [1] [C. Remple](#), J. Huso, M.H. Weber, J.S. McCloy, and M.D. McCluskey, "Electron Irradiation Effects on Photoluminescence and Conductivity of Hf and Zn doped β -Ga₂O₃," *J. Appl. Phys.* (**In Review**)
- [2] B.L. Dutton, J.B. Varley, [C. Remple](#), J. Jesenovec, J.-X. Shen, S. Ghandiparsi, A. Neal, Y. Kim, A. Green, L.F. Voss, M.D. McCluskey, and J.S. McCloy, "Melt-Grown Semi-Insulating Mn: β -Ga₂O₃ Single Crystals Exhibiting Unique Visible Absorptions and Luminescence," *J. Vac. Sci. Technol. A*, **2024**
- [3] [C. Remple](#), L. M. Barmore, J. Jesenovec, J. S. McCloy, and M. D. McCluskey, "Photoluminescence Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃," *J. Vac. Sci. Technol. A*, **2023**
- [4] J. Jesenovec, B.L. Dutton, [C. Remple](#), N. Smith-Gray, M. Murugesan, C. Peterson, B.K. Downing, S. Krishnamoorthy, M.D. McCluskey, and J.S. McCloy, "Alternative Alloy to Increase Bandgap In Gallium Oxide, β -(Sc_xGa_{1-x})₂O₃, and Rare Earth Stark Luminescence," *J. Cryst. Growth*, **2022**
- [5] J. Jesenovec, [C. Remple](#), J. Huso, B. Dutton, P. Toews, M.D. McCluskey, and J.S. McCloy, "Photodarkening and Dopant Segregation in Cu-doped β -Ga₂O₃ Czochralski Single Crystals," *J. Cryst. Growth*, **2021**
- [6] [C. Remple](#), J. Huso, and M. D. McCluskey, "Photoluminescence and Raman mapping of β -Ga₂O₃," *AIP Adv.*, **2021**
- [7] D. Chiu, Y. He, Z. Gao, [C. Remple](#), and C.-H. Chang, "Growth Kinetics of ZnS Thin Films from a High-Rate Chemical Bath Deposition with Trisodium-Nitrioltriacetate Complexing," *ECS J. Solid State Sci. Technol.*, **2018**

Presentations

- [1] *Photoluminescence Mapping and Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃*, [C. Remple](#), L.M. Barmore, J. Jesenovec, J.S. McCloy, M.D. McCluskey, **GOX August 2023**, Buffalo, NY., Poster
- [2] *Photoluminescence Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃*, [C. Remple](#), L.M. Barmore, J. Jesenovec, J.S. McCloy, M.D. McCluskey, **EMC MRS June 2023**, University of California, Santa Barbara, CA, Talk
- [3] *Photoluminescence Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃*, [C. Remple](#), L.M. Barmore, J. Jesenovec, J.S. McCloy, M.D. McCluskey, **GOX August 2022**, Washington, D.C., Poster
- [4] *Photoluminescence Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃*, [C. Remple](#), L.M. Barmore, J. Jesenovec, J.S. McCloy, M.D. McCluskey, **EMC MRS June 2022**, The Ohio State University, Columbus, OH, Talk
- [5] *Fe³⁺ and Cr³⁺ Photoluminescence of Fe doped β -Ga₂O₃*, [C. Remple](#), J. Huso, M.D. McCluskey, **APS March Meeting 2021**, Virtual, Talk
- [6] *Growth Kinetics of ZnS Thin Films from a High-Rate Chemical Bath Deposition with Trisodium-nitrioltriacetate Complexing*, D. Chiu, Y. He, Z. Gao, [C. Remple](#), C.-H. Chang, **PNW AVS September 2017**, Oregon State University, Corvallis, OR, Poster

Professional Organizations

American Physical Society – Student Member

Materials Research Society WSU Student Chapter

- President, 2021-2024

Materials Research Society OSU Student Chapter

- President, 2015-2016 and 2016-2017, and Treasurer during 2014-2015
- Presided over and organized all meetings, lab tours, industry field trips, seminars, and special events

American Institute of Chemical Engineers – Student Member, Chemical Engineering Car Competition (2016)

Specialized Coursework

- PHYSICS 581: Graduate-level semiconductor physics (properties and characterization methods, emphasis on point defects)
- MSE 403: Ceramic materials and glass (structure, properties, defects, and applications)
- MATSE 571: Graduate-level microscopic analysis of solid surfaces (covering electrochemistry, spectroscopy techniques including XAS, XPS, IR, UV-Vis, Auger, NMR, and microscopy techniques including SEM, TEM, AFM, and STM)
- MSE 515: Graduate-level electronic properties of materials (Electron energy bands in solids, electrical conduction in metals and semiconductors, applications to semiconducting devices based on silicon and III-V compounds)
- PHYSICS 563: Graduate-level solid state physics (crystal structure, thermal, electronic, and optical properties)
- CHEM 480: Solid state chemistry (crystallography and diffraction, phase diagrams and polymorphism, solid state reactions and synthesis, superconductors)
- ECE 416, 418: Semiconductor device physics, VLSI processing, and basic semiconductor processing techniques
- ECE 415: Synthesis and characterization of nanomaterials, applications of nanomaterials, and integration of nanotechnology
- CHE 444: Thin film device fabrication, and laboratory investigating influential process variables

Certificates

- SChE Certificate Program: Inherently Safer Design, Basics of Laboratory Safety, and Process Safety Lessons Taught from Experience