Shamara P. Collins, Ph.D.

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CAREER SUMMARY: Award winning Electrical Engineer with over 10 years of experience in the Renewable Energy field. Interdisciplinary researcher holding a doctorate degree in Materials Characterization and Thin Film Solar. Successful entrepreneur and decisive leader able to work across cultures, plus efficiently manage multiple projects simultaneously.

EDUCATION

2012 – 2018 University of South Florida, Tampa, FL
Doctor of Philosophy, Electrical Engineering, 3.80/4.0

2007 – 2012 Morgan State University, Baltimore, MD
Bachelor of Science, Electrical Engineering, 3.57/4.0 (*Cum Laude*)

TECHNICAL

- Course/Certificate: NASA Global Learning and Observations to Benefit the Environment (2022); NABCEP - Scanifly Software: Drones, 3D Mapping, and LiDar in Solar (2021); Fundamentals of Utility Law (2019); Preparing for College Teaching (2016); Clean Room and Laser User (Classes 3b and 4)
- Instrumentation: Engineering lab equipment, Materials characterization tools, Cryo and Vacuum System

PROFESSIONAL EXPERIENCE

2023 – **Present** Research Engineer
VP Research and Economic Development, Morgan State University in Baltimore, MD
Roles: Engineering competency used in managing external partnerships, designing workforce development programs, and conducting research on select projects.

- Research projects- Climate Science Division projects: Patuxent Environmental & Aquatic Research Laboratory (PEARL) and Baltimore Social-Environmental Collaborative (BSEC).
- Develop and maintain relationships with institutions, universities, and businesses outside of the Morgan network.

2023 – 2023 Research Assistant
Climate Science Division, Morgan State University in Baltimore, MD
Roles: Electrical Engineering competency provided to BSEC focused on place-based research to address the climate crisis and its impact on vulnerable communities.

- Observation network design and led community engagement.
- Built equipment, conducted field installation (LiDAR & Weather stations), and maintenance.
- Managed project coordination among university researchers.

2022 – 2023 Technical Advisor
Clean Energy and Space Research International Collaboration, Morgan State University in Baltimore, MD
Roles: Subject matter expertise in solar energy (ex. organic cells-perovskite) applied to space application challenges with focus on measurement tool deployments and acquirement of telemetry in real-time.

- Designed experiments, analyzed data, identified technical problems, and proposed solutions.
- Developed instruction manuals and tutorial videos for international team members.

2018 – 2020 Oak Ridge Institute for Science and Education (ORISE) – Science, Technology, and Policy Fellow
U.S. Department of Energy (DOE), Solar Energy Technologies Office in Washington, DC
Roles: Strategy development, program design, and technology management for Technology-to-Market and Strategic Analysis & Institutional Support subprograms.

- Metric tracking, timelines, and deliverables. Oversaw design of the **NREL administered Solar District Cup**, a multi-disciplinary techno-economic collegiate design competition. Management skills resulted in project 5% below budget and 20% representation of Minority Serving Institutions (MSI). Managed **Innovative Pathways** projects specific to supporting small businesses/commercialization.
- Program Design skills sharpened by supporting initial design and strategic goal setting for the **National Community Solar Partnership**. Initiated and oversaw development of the **MSRDC Science and Technology Research Partnership** using the *Inter Agency Agreement* funding tool. Supported the cross-office workforce development funding initiative, **Educational Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments (EMPOWERED***)*.
- Interpersonal and relationship building skills were used to sustain external relations with Federal Agencies to support the *Interagency Collaborative on Energy Solutions for Low-Income Communities*. Expanded stakeholders by supporting the *Framework for P-12 Engineering Learning.* Launched **SETO's First Diversity,**

Equity, and Inclusion working group to address employee viewpoints by formulating internal and external program goals.

2015 – 2022 Co-Founder and Chief Technology Officer
The BEMI Group, LLC
Roles: Lead consulting company by using **technical acumen** and **business savvy** to support nonprofits and minority-owned businesses in achieving their goals. Workforce development subject matter expert servicing federal and state gov't agencies. Education consultant for renewable energy curriculum development.

RESEARCH EXPERIENCE

2012 – 2018 Graduate Research Assistant, Electrical Engineering/Clean Energy Research Center (CERC)
Fellowship(s): **National Science Foundation (NSF) – Graduate Research Fellow Program (GRFP), Florida Education Fund (FEF), NSF Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Bridge to the Doctorate (BD)**

- NSF GRFP and FEF, University of South Florida, Tampa, FL
  "Photoluminescence Characterization of EVT-grown Extrinsically Doped CdTe Solar Cells" – Collected and analyzed photoluminescence (PL) spectra of Cadmium Telluride (CdTe) thin films deposited by the Elemental Vapor Transport (EVT) technique with varying stoichiometry (Cd/Te ratios) and Group V dopants/concentrations. Determined the effect of deposition technique, identified defect locations and types, and effect of dopant incorporation on the CdTe defect structure.

- NSF GRFP, University of South Florida, Tampa, FL
  "PL Characterization of Laser Annealed EVT CdTe Thin Films" – Performed laser anneal experiments for direct $CdCl_2$ heat treatment to improve fabrication processes. Collected and analyzed PL spectra; determined annealing's effect on solar cell performance.

- NSF FGLSAMP BD, University of South Florida, Tampa, FL
  "PL Characterization of EVT-grown Intrinsically Doped CdTe Solar Cells" – Analyzed PL spectra of CdTe thin films grown by EVT technique with varying stochiometric ratios of Cd/Te; successfully determined defect location and type.

2009 – 2011 Undergraduate Research Assistant
Fellowship(s): **National Science Foundation (NSF) – Sustainable Energy Alternatives and Advanced Materials (SEAM) Research Experience for Undergraduates, The Leadership Alliance – Summer Research Early Identification Program (SR-EIP), National Institutes of Health (NIH) – Minority Biomedical Research Support-Research Initiative for Scientific Enhancement (MBRS-RISE)**

- The Leadership Alliance SR-EIP, Hunter College, New York, NY
  "NMR studies of Fuel Cell Electrolyte Membranes" – Performed nuclear magnetic resonance on the membrane of a hydrogen fuel cell; determined the effects of pressure and temperature on hydrogen's proton transport.

- NSF SEAM, University of South Florida (USF), Tampa. FL
  "Optimizing the Fabrication of Dye-Sensitized Solar Cells" – Developed fabrication process to increase dye-sensitized solar cell efficiency from 0.28% to 3.1%; authored and submitted technical abstracts/ethics reports.

- NIH MBRS-RISE, Morgan State University (MSU), Baltimore, MD
  "Electra-Van Battery Analysis" – Retrofitted an electric van made by Volkswagen circa 1979; performed battery analysis and restored van with modern-energy efficient technology.

SELECTED PUBLICATIONS/PRESENTATIONS

1. **Collins, Shamara P.**, "The Effect of Processing Conditions on the Energetic Diagram of CdTe Thin Films Studied by Photoluminescence" (2018). *Graduate Theses and Dissertations.*
2. **S. Collins**, C. A. Hsu, V. Palekis, A. Abbas, M. Walls, and C. Ferekides, "Se Profiles in CST Films Formed by Annealing CdTe/CdSe Bi-Layers," *2018 IEEE 7th World Conference on Photovoltaic Energy Conversion (WCPEC) (A Joint Conference of 45th IEEE PVSC, 28th PVSEC & 34th EU PVSEC)*, 2018, pp. 0114-0118.
3. F. Rahimi, **S. P. Collins**, C.S. Ferekides, and A.M. Hoff, "Methylammonium iodide and its effect as an intrinsic defect in perovskite structure and device performance." *Organic Electronics*, vol. 62, 2018, pp. 304-310.

4. **S. Collins *et al.***, "PL Study of Phosphorus-Doped CdTe EVT Films," *2017 IEEE 44th Photovoltaic Specialist Conference (PVSC)*, 2017, pp. 1638-1642.
5. **Collins, Shamara**, "Pathways to STEM Careers and Photoluminescence Study of EVT CdTe Thin Films." Interdisciplinary Seminar Series, March 2017, Morgan State University, Baltimore, MD. Oral Presentation.
6. Palekis, V., **Collins, S.**, Khan, M., Evani, V., Misra, S., Scarpulla, M. A, Abbas, A., Walls, J., and Ferekides, C., "Near infrared laser $CdCl_2$ heat treatment for CdTe solar cells," *2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC)*, 2016, pp. 1498-1502.
7. **Collins, S.**, Vatavu, S., Evani, V., Khan, M., Bakhshi, S., Palekis, Evani, V, Palekis, V., and Ferekides, C., "Radiative recombination mechanisms in CdTe thin films deposited by elemental vapor transport." *Thin Solid Films*, vol. 582, 2015, pp. 139-145.
8. **Collins, S.**, Vatavu, S., Evani, V., Khan M., Bakhshi, S., Palekis, V., and Ferekides, C., "Photoluminescence studies of EVT deposited CdTe thin films." European Material Research Society Meeting, May 2014, Lille, France. Poster presentation.
9. S. Bakhshi, **S. Collins**, C. Ferekides and A. Takshi, "Study the effect of TiO_2 annealing and $TiCl_4$ treatment on the performance of dye-sensitized solar cells," *2013 IEEE 39th Photovoltaic Specialists Conference (PVSC)*, 2013, pp. 2694-2697.
10. **Collins, S.**, Khan M., and Ferekides, C., "Optimizing the fabrication process of dye-sensitized solar cells." Interdisciplinary Seminar Series, September 2011, Morgan State University, Baltimore, MD. Oral presentation.
11. **Collins, S.**, Farrington J., and Greenbaum, S., "Nuclear magnetic resonance studies of fuel cell electrolyte membranes." Presidential Inauguration Symposium, September 2010, Morgan State University, Baltimore, MD. Oral Presentation.
12. **Collins, S.** and Dickens, C., "Electra-van battery analysis." Annual Biomedical Research Conference for Minority Students, November 2009, Phoenix, AZ. Poster presentation.
13. **Collins, S.**, Griffin, B., and Dickens, C., "$CuInSe_2$ solar cell physical device modeling." 2nd Innovative STEM Conference, April 2009, Hunt Valley, MD. Poster presentation.

LEADERSHIP ROLES

2019 – 2020 **Clean Energy Leadership Institute (CELI)** – Organization for young professionals with diverse backgrounds that equips them with technical knowledge of the clean energy sector and leadership development training.
- Research, analyzed, and authored blog entitled, "Traversing the STEM Pathways: A Minority's Journey."
- Founding Member of the Diversity, Equity, and Inclusion Council

2013 – 2015 **American Association of University Women (AAUW)** – Established USF chapter to cultivate a sustainable community for graduate women in the STEM fields.
- Co-Founder and Vice-President (2013-2014): Created standard operation procedures and established organization bylaws for AAUW.
- President (2014-2015): Organized volunteer participation for the annual Great American Teach–In; designed themed Photo Booth ("When I Grow-up, I want to Be…") and received Best Exhibit Booth Award (USF Engineering EXPO).

2009 – 2011 **Society of Women Engineers** – MSU chapter for the world's largest advocate and catalyst for change for women in engineering and technology.
- President (2010-2011): Created campus-wide recycling initiative. Hosted Table Etiquette Forum to increase student capacity and confidence while dining at national conferences.
- Treasurer (2009-2010): Managed organization funds and procured T-Shirts for all members.

SELECTED HONORS AND AWARDS

2021 **Calculated Genius Women's History Month Feature**
2018 – 2019 CELI Fellowship - Washington, DC's Cohort
2015 **Recognized in NSF's Women's History Month Tribute**
2013 – 2018 NSF Graduate Research Fellowship Program, USF
2011 Finalist, Thurgood Marshall College Fund - Opportunity Funding Corp. **Venture Challenge** (Atlanta, GA)
2011 Poster Presentation Award, Annual Biomedical Research Conference for Minority Students
2011 1st Place Award, NSF SEAM REU Poster Symposium, USF
2009 – 2011 MBRS RISE Scholar, MSU
2008 Outstanding Performance in **Critical Thinking Award**, MBRS-RISE

SERVICE/PROFESSIONAL AFFILIATIONS

2021 – Present Co-Founder & Board Member, Foundational Fundamentals 501c3
2019 – 2020 Collaborator, "Framework for P-12 Engineering Learning: A Defined and Cohesive Educational Foundation for P-12 Engineering," American Society for Engineering Education (ASEE)
2019 Energy Equity and Lift America Legislation Discussions
2015 – Present Board Member, MBRS RISE Advisory Group
2008 – 2018 Student Subject, The National Longitudinal Study of Young Life Scientists, Northwestern University