Conrad R. A. Cole

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EDUCATION

University of Florida, Gainesville, FL **2014 - 2020**
Ph.D., Mechanical Engineering
Dissertation Title: Electronic Entropy Contributions to Oxygen Vacancy Formation Reaction in Nonstoichiometric Oxides

University of Florida, Gainesville, FL **2012 - 2014**
M.S., Mechanical Engineering

University of Central Florida, Orlando, FL **2005 - 2010**
B.S., Mechanical Engineering

SUMMARY

Doctoral candidate with diverse array of research experience in renewable energy science and technology, computational materials science. Primarily interested in the direct conversion and storage of solar energy through clean, renewable processes. Computational and experimental experience in the discovery and analysis of novel materials for solar and electrochemical energy storage applications.

SKILLS

Technical Communication, Organizational Leadership, Adaptability, Multidisciplinary Thinking, Python, C/ C++, High-Performance Computing, VASP, Pymatgen, Linux/Ubuntu, Unix Shell, Git, PyCharm, Visual Studio, Java, Wolfram Mathematica

EXPERIENCE

Graduate Research Assistant, University of Florida, Gainesville, FL **August 2014 - Present**

- Developed mathematica scripts that convert raw thermogravimetric data to oxygen nonstoichiometry as a function of temperature and oxygen partial pressure
- Helped build new laboratory, setup multiple workstations and create respective standard operating protocol
- Developed mathematica scripts that fit defect reaction models to nonstoichiometry data and extracts partial molar thermodynamic quantities
- Synthesized and characterized perovskite oxides for solar thermochemical fuel synthesis
- Leveraged electronic structure theory (VASP, Pymatgen, CASM), condensed matter physics, statistical mechanics and chemical physics in order to complement experimental work
- Applied computational tools to quantitatively validate novel theory which was derived analytically (abstracts accepted by The Materials Research Society and The American Chemical Society)

Graduate Teaching Assistant, University of Florida, Gainesville, FL **Jan 2015 - May 2017**

- Proctored exams, held instructional office hours, and facilitated learning for over 100 students per semester
- Designed and graded exam problems, organized special preparatory sessions prior to exams
- Communicated with students through course website in order to address specific learning needs and share useful supplemental material

Mickey Leland Energy Fellow, NETL, Morgantown, WV **June 2014 - Aug 2014**

- Research Fellowship on the Hybrid Performance Project (HYPER) at the National Energy Technology Laboratory
- Utilized dSPACE and MATLAB & Simulink to perform cyber-physical simulations of a solid oxide fuel cell gas turbine hybrid system
- Analyzed fuel cell electrical load transients and their consequent effects on the operating conditions of solid oxide fuel cell gas turbine hybrid system

Consultant, Booz Allen Hamilton, Orlando, FL **October 2010 - Jun 2011**

- Developed 3D model of urban environment in Google Sketchup software with layers and dimensions in order to specify characteristics of each structure which facilitated meetings with client for generation of system requirements
- Created and maintained corresponding spreadsheet for configuration of live structures and other physical features with detailed dimensions and specifications

- SharePoint site administrator, responsible for multiple tasks including creating working group sites to enhance collaboration between team members and monitoring user site permissions

PUBLICATIONS

Cole, C. R. (2019). Estimation of Electronic Entropy Contributions to Oxygen Vacancy Formation Reaction in Nonstoichiometric Oxides via analysis of electronic structure properties. Presentation at the Materials Research Society Fall Meeting & Exhibit, Boston, MA.

Cole, C. R., & Scheffe, J.R. (2016). Thermodynamic Characterization of Yttrium Strontium Manganite Perovskites and Influence of Temperature on Redox Properties. Presentation at the ASME 10th International Conference on Energy Sustainability, Charlotte, NC.

Randhir, K., Rhodes, N. R., Grunewald, J., **Cole, C. R.**, Bobek, M., Li, L., Hahn, D. W., Mei, R., Klausner, J. F., AuYeung, N. (2014). Thermochemical Energy Storage Using Strontium Carbonate/Strontium Oxide System for Solar Energy Utilization. Presentation at the 2014 AIChE Annual Meeting, Atlanta, GA.

PROJECTS

- Contributed to python for materials genomics (pymatgen) code repository
- Created personal website/portfolio via minimal mistakes jekyll theme
- Developed basic to-do list web app via react/redux/webpack framework
- Implemented simplified version of google's page rank graph algorithm via adjacency list
- Implemented linking and build configuration for OpenGL app (visualization of sorting algorithms) in linux via cmake

COURSEWORK

Computational Chemistry, Data Structures and Algorithms, Electroceramics, Numerical Methods of Engineering Analysis, Principles of Engineering Analysis, Mathematical Basis of Chemical Engineering, Python Programming, Solid State Chemistry, Solar Energy Utilization, Energy Conversion, Energy Storage

VOLUNTEERING

- Founded the American Association of Blacks in Energy (AABE) Gator Chapter at the University of Florida during Master's degree program. AABE is dedicated to ensure the input of African Americans and other minorities into the discussions and developments of energy policies regulations, R&D technologies, and environmental issues.
- Active member of the National Society of Black Engineers, the National Society of Black Physicists, American Society of Mechanical Engineers, American Institute of Chemical Engineers, Materials Research Society, American Chemical Society and American Physical Society.