

Joya A. Cooley

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Research interests

- Solid-state synthesis
- Energy conversion materials
- Magnetic properties of intermetallics
- Structure-property relationships

Education

2012–2018 PhD in Chemistry, University of California, Davis. Thesis Title: *Investigation of Novel Europium-Based Zintl Phases for Thermoelectric Applications*. Advisor: **Professor Susan Kauzlarich**.

2008–2012 B.S. Chemistry, Furman University. Thesis Title: *Characterization of Self-Assembled Monolayers of Octadecanethiol and Dodecanethiol Using Polarization Modulation Reflection-Absorption Spectroscopy and Optical Tensiometry*. Advisor: **Professor Marion Martin**.

2008–2012 B.A. Music, Furman University.

Awards and recognitions

American Chemical Society Division of Inorganic Chemistry Travel Award Recipient (April 2017)

Co-chair of the first Gordon Research Seminar on Solid-State Chemistry (July 2016)

Ford Foundation Dissertation Fellowship Honorable Mention (2016)

International Thermoelectric Society Outstanding Poster Award at the International Conference on Thermoelectrics (2015)

Department of Education GAANN Fellowship Recipient (2014)

Carl F. Storm Minority Fellowship (Gordon Research Conference, 2014)

UC Davis Chemistry Department Outstanding Teaching Assistant Award (2014)

Alfred P. Sloan Scholarship Recipient (2013)

Bradford Borge Fellowship recipient (2012)

Second Place in poster presentation competition at 2011 National NSF EPSCoR Conference (2011)

Selected representative of South Carolina at 2011 National NSF EPSCoR Conference (2011)

Nathan A. Einstein Music Scholarship Recipient (2011–2012)

Viola and Grady E. Hodgens Music Scholarship Recipient (2011– 2012)

Phi Eta Sigma Honor Society, Treasurer (Inducted 2009)

Furman University Deans List (2008–2012)

Skills

Expertise in synthesis of intermetallic phases including high temperature flux synthesis, powder metallurgy, arc-melting, microwave synthesis, and spark-plasma sintering methods. Proficiency in several characterization methods including powder X-ray diffraction, single crystal X-ray diffraction, SQUID magnetometry, and high- and low-temperature thermoelectric property measurement. Experience in quantum mechanical theoretical calculations using the linear-muffin-tin-orbital approximation method.

Publications

6. K. P. Devlin, N. Kazem, J. V. Zaikina, J. A. Cooley, J. R. Badger, J. C. Fettinger, V. Taufour, and S. M. Kauzlarich, $\text{Eu}_{11}\text{Zn}_4\text{Sn}_2\text{As}_{12}$: A ferromagnetic Zintl semiconductor with a layered structure featuring extended Zn_4As_6 sheets and ethane-like Sn_2As_6 units. *Chem. Mater.* **30** (2018) 7067–7076. DOI: [10.1021/acs.chemmater.8b02749](https://doi.org/10.1021/acs.chemmater.8b02749)
5. M. Stavinoha, J. A. Cooley, S. G. Minasian, T. M. McQueen, S. M. Kauzlarich, C.-L. Huang, and E. Morosan, Charge density wave behavior and order-disorder in the antiferromagnetic metallic series $\text{Eu}(\text{Ga}_{1-x}\text{Al}_x)_4$. *Phys. Rev. B* **97** (2018) 195146. DOI: [10.1103/PhysRevB.97.195146](https://doi.org/10.1103/PhysRevB.97.195146)
4. J. A. Cooley, P. Promkhan, S. Gangopadhyay, D. Donadio, B. R. Ortiz, E. S. Toberer, and S. M. Kauzlarich, High Seebeck coefficient and unusually low thermal conductivity near ambient temperatures in layered compound $\text{Yb}_{2-x}\text{Eu}_x\text{CdSb}_2$, *Chem. Mater.* **30** (2018) 484–493. [DOI: [10.1021/acs.chemmater.7b04517](https://doi.org/10.1021/acs.chemmater.7b04517)]
3. E. L. Kunz-Wille, J. A. Cooley, J. C. Fettinger, N. Kazem, and S. M. Kauzlarich, A new solid solution compound with the $\text{Sr}_{21}\text{Mn}_4\text{Sb}_{18}$ structure type: $\text{Sr}_{13}\text{Eu}_8\text{Cd}_3\text{Mn}_1\text{Sb}_{18}$, *Z. Kristallogr.* **232** (2017) 593–599. [DOI: [10.1515/zkri-2016-2034](https://doi.org/10.1515/zkri-2016-2034)]
2. N. Kazem, J. A. Cooley, E. C. Burks, K. Liu, and S. M. Kauzlarich, Synthesis, characterization, and low temperature transport properties of $\text{Eu}_{11-x}\text{Yb}_x\text{Cd}_6\text{Sb}_{12}$ solid solution Zintl phases, *Inorg. Chem.* **55** (2016) 12230–12237. [DOI: [10.1021/acs.inorgchem.6b01947](https://doi.org/10.1021/acs.inorgchem.6b01947)]
1. J. A. Cooley, N. Kazem, J. V. Zaikina, J. C. Fettinger, and S. M. Kauzlarich, Effect of isovalent substitution on the structure and properties of $\text{Eu}_7\text{Cd}_4\text{Sb}_{8-x}\text{As}_x$, *Inorg. Chem.* **54** (2015) 11767–11775. [DOI: [10.1021/acs.inorgchem.5b01909](https://doi.org/10.1021/acs.inorgchem.5b01909)]

Teaching

Teaching Assistant Consultant Fellow with UC Davis Center for Educational Effectiveness (Spring 2015–Winter 2017): Responsible for attending weekly meetings with the dual purposes of workshop planning and general professional development in areas of teaching and facilitation. Responsible for planning and orchestrating Teaching Assistant Orientation in Fall for all incoming teaching assistants, as well as a fall workshop and two workshops in a winter workshop series intended as professional development for current graduate student/postdoctoral instructors. Also responsible for consulting with graduate student/postdoctoral instructors one-on-one on various subjects including Statement of Teaching Philosophy, mid-quarter inquiries, video recordings, and presentation skills.

Teaching assistant for Inorganic Chemistry (124A) (Fall 2015) Responsible for grading weekly quizzes and homework, holding office hours, and making quiz and homework keys. As part of GAANN mentored teaching quarter, also responsible for additional duties such as holding a midterm review session and giving a guest lecture attended and evaluated by GAANN faculty mentor.

Safety teaching assistant for General Chemistry (2ABC) (Winter 2014–Fall 2014): Responsible for several aspects of general chemistry including TA supervision in lab, observation of labs to ensure proper personal protective equipment and safe procedures, and leading weekly TA meetings. Additionally responsible for leading midterm and final exam review sessions for students and weekly discussions with TAs on leading effective discussions, including composing, discussing, and distributing worksheets for TAs to go over with students.

Teaching assistant for General Chemistry (2ABC) (Fall 2012–Fall 2013, Winter 2016): Responsible for leading two sections of weekly labs and discussion sections, holding office hours to assist students individually, proctoring exams, and grading exams.

Mentoring

Johnny Johnson, UC Davis Undergraduate Researcher (Fall 2016 Spring 2017)

Pichit Promkhan*, Mentorships for Undergraduate Research Participants in the Physical and Mathematical Sciences undergraduate student (Winter 2015 Spring 2016)

Ali Keyani*, Summer Research Internship Program for Economically Disadvantaged High School Students student (Summer 2015)

Justina Robleto-Barkley*, Vallejo High School Biotechnology Academy Mentee (Spring 2015)

Catherine Jovez*, Vallejo High School Biotechnology Academy Mentee (Spring 2015)

Kaelinn Ocampo*, Vallejo High School Biotechnology Academy Mentee (Spring 2015)

Alex Brown*, Research Experience for Undergraduates student (Summer 2013)

*denotes student from a community historically underserved in STEM or higher education

Presentations

Magnetocaloric materials based on binary and ternary Mn compounds: Screening and testing, Materials Research Society Fall Meeting, Boston, MA, 2018.

DFT-screened magnetocaloric material: MnPtGa, Gordon Research Conference on Solid State Chemistry 2018, New London, NH, USA. *Poster*.

Promising Zintl phase thermoelectric material $\text{Yb}_{2-x}\text{Eu}_x\text{CdSb}_2$, North American Solid State Chemistry Conference 2017, Santa Barbara, CA, USA. *Poster*.

Thermoelectric performance of Zintl phase $\text{Yb}_{2-x}\text{Eu}_x\text{CdSb}_2$ exhibiting low thermal conductivity, American Chemical Society Spring 2017 Meeting, San Francisco, CA, USA. *Oral*.

$\text{Yb}_{2-x}\text{Eu}_x\text{CdSb}_2$: Potential thermoelectric material exhibiting high Seebeck and low thermal conductivity, Gordon Research Conference on Solid State Chemistry 2016, New London, NH, USA. *Poster*.

Thermoelectric properties of $\text{Yb}_{14-x}\text{Eu}_x\text{MnSb}_{11}$, University of California Symposium for Chemical Sciences 2016, Lake Arrowhead, CA, USA. *Poster*.

Investigating the effect of cationic rare-earth substitution on new Zintl phase solid solution $\text{Eu}_{11-x}\text{Yb}_x\text{Cd}_6\text{Sb}_{12}$, International Conference on Thermoelectrics 2015, Dresden, Germany. *Poster*.

New Zintl phase solid solution $\text{Eu}_{11-x}\text{Yb}_x\text{Cd}_6\text{Sb}_{12}$ ($x = 1, 2$) for thermoelectric applications, North American Solid State Chemistry Conference 2015, Tallahassee, FL, USA. *Poster*.

New Zintl phase solid solution for thermoelectric applications, Departmental seminar 2015, Davis, CA, USA. *Oral.*

Investigation of new Zintl phase solid solution $\text{Eu}_7\text{Cd}_4\text{Sb}_{8-x}\text{As}_x$ ($x = 2, 3, 4,$ and 5) for thermoelectric applications, Gordon Research Conference on Solid State Chemistry 2014, New London, NH, USA. *Poster.*

Thermoelectric properties of the new Zintl phase solid solution $\text{Eu}_7\text{Cd}_4\text{Sb}_{8-x}\text{As}_x$ ($x = 2, 3, 4,$ and 5), International Conference on Thermoelectrics 2014, Nashville, TN, USA. *Poster.*

Investigation of new solid solution $\text{Eu}_{11-x}\text{Yb}_x\text{Cd}_6\text{Sb}_{12}$, ICMR Summer School on Modeling Materials in 3D 2013, Santa Barbara, CA, USA. *Poster.*

Characterization of self-assembled monolayers of octadecanethiol and dodecanethiol, Furman Engaged! 2012, Greenville, SC, USA. *Oral.*

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