Mock - Dr. Alexander Steven - Curriculum Vitae

> [!WARNING] **Mock Document - For Demonstration Purposes Only**

- **Associate Professor, Mechanical and Aerospace Engineering**
- **Senior Research Scientist, Center for Automotive Research**
- **The Ohio State University**

> Updated on 2025-08-21 by @KemingHe

Contact Information

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Research Expertise

Primary Research Areas

- **Polymer-Ceramic Composite Electrolytes**: Novel hybrid solid-state ion conductors
- **Computational Materials Design**: AI-driven discovery of electrolyte compositions
- **Interface Engineering**: Solid-solid contact optimization and impedance reduction
- **Multi-Physics Modeling**: Coupled electrochemical-mechanical simulations

Technical Specializations

- Hybrid organic-inorganic electrolyte synthesis via sol-gel processing
- Machine learning-accelerated materials screening and optimization
- Operando synchrotron X-ray spectroscopy of battery interfaces
- Density functional theory calculations for ion transport mechanisms
- High-throughput combinatorial synthesis of electrolyte libraries

Education

Ph.D. Materials Science and Engineering (2018)
University of California, Berkeley

M.S. Chemical Engineering (2015)
Northwestern University

B.S. Chemical Engineering (2013)
University of Michigan, Ann Arbor

Professional Experience

Associate Professor (2023 - Present)
Department of Mechanical and Aerospace Engineering, The Ohio State University

Assistant Professor (2020 - 2023)
Department of Mechanical and Aerospace Engineering, The Ohio State University

Senior Research Scientist (2020 - Present)
Center for Automotive Research, The Ohio State University

Postdoctoral Research Fellow (2018 - 2020)
Argonne National Laboratory, Materials Science Division

Recent Awards and Honors (2020-2025)

- **NSF CAREER Award** (2024) - $545,000 for solid-state battery research
- **Young Investigator Award**, Battery Division of The Electrochemical Society (2023)
- **Outstanding Research Award**, College of Engineering, The Ohio State University (2022)
- **Early Career Faculty Excellence Award**, Department of MAE (2021)
- **Best Paper Award**, Journal of Power Sources (2020)

Major Grants and Funding (2020-2025)

As Principal Investigator

1. **NSF CAREER: Multiscale Design of Polymer-Ceramic Composite Electrolytes** (2024-2029)
   Total: $545,000

2. **DOE Vehicle Technologies: Fast-Charging Solid-State Battery Systems** (2023-2026)
   Total: $1.2M

3. **ARPA-E BEEST: Battery Electrolyte Engineering with Synthetic Tools** (2022-2025)
   Total: $1.8M

4. **Tesla-OSU Partnership: Polymer-Ceramic Interface Optimization** (2021-2024)
   Total: $520,000

As Co-Principal Investigator

1. **NSF Future Manufacturing: Advanced Solid-State Battery Manufacturing** (2020-2025)
   Total: $2.8M (Co-PI with Dr. Thompson, Dr. Davis)

2. **DOE BATT: Advanced Battery Materials Consortium** (2020-2023)
   Total: $1.5M (Co-PI with Dr. Martinez)

Selected Publications (2020-2025)

Peer-Reviewed Journal Articles

Published

1. **Steven, A.**, Chen, L., & Wilson, K. (2025). "Hybrid Polymer-Ceramic Electrolytes for High-Energy Solid-State Batteries." *Nature Energy*, 10(3), 234-245. **IF: 67.4**

2. Martinez, R., **Steven, A.**, & Thompson, S. (2024). "Machine Learning-Enhanced Battery State Estimation Using Multi-Modal Sensor Fusion." *Journal of Power Sources*, 598, 234567. **IF: 9.2**

3. **Steven, A.**, Park, J., & Rodriguez, M. (2024). "Thermal Runaway Prevention in Lithium-Metal Solid-State Batteries." *Advanced Energy Materials*, 14(15), 2301234. **IF: 27.8**

4. Zhao, M., **Steven, A.**, Martinez, R., & Thompson, K. (2024). "Multi-Scale Modeling of Ion Transport in Composite Solid Electrolytes." *Journal of the Electrochemical Society*, 171(4), A1234-A1245. **IF: 3.9**

5. **Steven, A.**, White, J., & Brown, C. (2023). "In-Situ XPS Analysis of Solid-State Battery Interface Formation." *ACS Applied Materials & Interfaces*, 15(28), 33456-33467. **IF: 10.4**

6. Liu, X., **Steven, A.**, & Davis, P. (2023). "Fast-Charging Protocols for Solid-State Battery Systems: Safety and Performance Optimization." *Cell Reports Physical Science*, 4(8), 101456. **IF: 8.9**

7. Taylor, K., **Steven, A.**, & Miller, D. (2023). "Computational Design of Solid-State Electrolyte Interfaces Using Density Functional Theory." *Chemistry of Materials*, 35(12), 4567-4578. **IF: 8.6**

8. **Steven, A.**, Kumar, S., & Johnson, R. (2022). "Electrochemical Impedance Analysis of Polymer Electrolyte Interfaces in All-Solid-State Batteries." *Electrochimica Acta*, 412, 140123. **IF: 7.3**

9. Green, A., **Steven, A.**, & Lee, P. (2022). "Solid-State Battery Degradation Mechanisms: A Multi-Modal Characterization Study." *Journal of Power Sources*, 528, 231789. **IF: 9.2**

10. Wang, H., **Steven, A.**, & Jones, B. (2021). "Scalable Synthesis of Superionic Lithium Conductors for Solid-State Energy Storage." *Advanced Materials*, 33(28), 2007891. **IF: 32.1**

11. **Steven, A.**, Thompson, M., & Clark, S. (2021). "Mechanical Properties of Thin-Film Solid Electrolytes for Flexible Battery Applications." *Nano Letters*, 21(15), 6234-6241. **IF: 12.3**

12. Rodriguez, C., **Steven, A.**, & Williams, T. (2020). "High-Temperature Performance of Garnet-Type Solid Electrolytes." *Solid State Ionics*, 358, 115512. **IF: 3.2**

13. **Steven, A.**, Lee, C., & Garcia, F. (2020). "Interface Engineering in Solid-State Lithium Batteries: Challenges and Opportunities." *Chemical Reviews*, 120(14), 6582-6634. **IF: 60.6**

Under Review

1. **Steven, A.**, Patel, N., & Anderson, K. (2025). "AI-Driven Discovery of Novel Solid-State Electrolyte Compositions." Submitted to *Nature Materials*.

Conference Publications (Selected)

1. **Steven, A.**, Chen, L., & Wilson, K. "Real-Time Battery Health Monitoring Using Deep Learning Architectures." *2024 IEEE Vehicle Power and Propulsion Conference*, Chicago, IL. **SAE Technical Paper 2024-01-0892**.

2. Rodriguez, M., **Steven, A.**, & Park, J. "Thermal Management of Solid-State Battery Packs for Electric Vehicles." *2024 SAE World Congress*, Detroit, MI. **SAE Technical Paper 2024-01-0156**.

3. **Steven, A.**, Kumar, S., & Johnson, R. "Solid-State Battery Pack Integration for Electric Vehicle Applications." *2023 SAE World Congress*, Detroit, MI. **SAE Technical Paper 2023-01-0678**.

4. White, J., **Steven, A.**, & Brown, C. "Machine Learning for Solid-State Electrolyte Interface Characterization." *2023 American Control Conference*, San Diego, CA.

5. **Steven, A.**, Taylor, K., & Miller, D. "Electrochemical Impedance Spectroscopy of Polymer-Ceramic Composite Electrolytes." *2022 ASME Dynamic Systems and Control Conference*, Atlanta, GA.

6. Green, A., **Steven, A.**, & Lee, P. "Multi-Physics Modeling of Solid-State Battery Degradation." *2022 International Conference on Solid State Ionics*, Boston, MA.

7. **Steven, A.**, Thompson, M., & Clark, S. "Fast-Charging Optimization for Solid-State Battery Systems." *2021 IEEE Energy Conversion Congress and Exposition*, Vancouver, Canada.

8. Wang, H., **Steven, A.**, & Jones, B. "Synthesis and Characterization of Novel Garnet-Type Solid Electrolytes." *2021 Materials Research Society Fall Meeting*, Boston, MA.

9. **Steven, A.**, Patel, N., & Anderson, K. "Interface Engineering Strategies for All-Solid-State Lithium Batteries." *2020 Electrochemical Society Meeting*, Honolulu, HI.

10. Rodriguez, C., **Steven, A.**, & Williams, T. "High-Temperature Stability of Solid-State Battery Materials." *2020 International Battery Seminar & Exhibit*, Fort Lauderdale, FL.

Teaching and Mentoring

Graduate Students Supervised

Current Ph.D. Students (3)

- Alex Thompson (2022-present): Sol-gel synthesis of hybrid electrolytes
- Jordan Kim (2023-present): Computational interface design
- Taylor Singh (2024-present): High-throughput materials screening

Graduated Ph.D. Students (2)

- Dr. Emily Chen (2020-2024): Now Principal Scientist at Solid Power Inc.
- Dr. David Martinez (2021-2024): Now Assistant Professor at University of Colorado Boulder

Current M.S. Students (4) **Graduated M.S. Students** (8)

Courses Taught

- **ME 6880**: Advanced Electrochemical Systems (Graduate, 2021-present)
- **ME 7260**: Solid-State Energy Storage (Graduate, 2022-present)
- **ME 3580**: Materials for Energy Applications (Undergraduate, 2020-present)

Professional Service (2020-2025)

Editorial Boards and Review Activities

- **Associate Editor**: *Journal of Electrochemical Energy Conversion* (2023-present)
- **Associate Editor**: *Electrochimica Acta* - Special Issue on Solid-State Batteries (2022)
- **Guest Editor**: *Journal of Power Sources* - Special Issue on Next-Generation Battery Materials (2021)
- **Review Panel Member**: NSF Division of Chemical, Bioengineering, Environmental, and Transport Systems (2024)
- **Review Panel Member**: DOE Vehicle Technologies Office Battery Materials Research (2023)
- **Review Panel Member**: ARPA-E IONICS Program (2022)

Regular Journal Reviewer

- *Nature Energy* (2020-present)
- *Advanced Materials* (2020-present)
- *Journal of Power Sources* (2020-present)
- *Electrochimica Acta* (2020-present)
- *ACS Applied Materials & Interfaces* (2021-present)
- *Chemistry of Materials* (2021-present)
- *Journal of the Electrochemical Society* (2020-present)
- *Solid State Ionics* (2020-present)

Conference Organization and Leadership

- **Program Chair**: 2025 International Conference on Solid State Ionics (upcoming)
- **Technical Program Committee**: 2024 International Battery Seminar & Exhibit
- **Session Chair**: 2023 ECS Meeting - Solid-State Batteries Session
- **Organizing Committee**: 2022 OSU Energy Storage Symposium
- **Session Organizer**: "Advanced Battery Materials" - 2021 Materials Research Society Spring Meeting
- **Technical Committee Member**: IEEE Vehicle Power and Propulsion Conference (2020-2023)

Professional Society Memberships and Service

- **Member**: The Electrochemical Society (Battery Division)
  - Technical Committee on Battery Technology (2021-present)
  - Programming Committee, Battery Division (2022-2024)
- **Member**: Materials Research Society
  - Energy and Sustainability Committee (2020-present)
- **Member**: American Chemical Society (Energy & Fuels Division)
  - Energy Storage Technical Group (2020-present)
- **Member**: American Society of Mechanical Engineers
  - Energy Storage and Fuel Cell Systems Committee (2021-present)
- **Member**: Institute of Electrical and Electronics Engineers
  - Vehicular Technology Society (2020-present)

Technical Committees

- **Chair**: Solid-State Battery Technical Committee, The Electrochemical Society (2024-present)
- **Vice-Chair**: Advanced Battery Materials Committee, Materials Research Society (2023-2024)
- **Secretary**: Energy Storage Technical Group, American Chemical Society (2021-2023)
- **Member**: Technical Committee on Battery Technology, The Electrochemical Society (2020-present)
- **Member**: IEEE Standards Committee on Battery Management Systems (2022-present)

Collaborative Networks

Industry Partnerships

- **Tesla Inc.**: Solid-state electrolyte research and development
- **CATL (Contemporary Amperex)**: Polymer-ceramic composite manufacturing
- **Solid Power Inc.**: Next-generation electrolyte formulations
- **Samsung SDI**: Advanced battery interface engineering

Academic Collaborations

- **Lawrence Berkeley National Laboratory**: Synchrotron X-ray characterization
- **Pacific Northwest National Laboratory**: Computational materials design
- **Massachusetts Institute of Technology**: Interface engineering research
- **University of California, San Diego**: Advanced spectroscopy methods

Key Research Outcomes

Patents and Patent Applications (2020-2025)

1. **Steven, A.**, Chen, L., Wilson, K. "Hybrid Solid-State Electrolyte Compositions for Lithium-Ion Batteries." US Patent Application 18/123,456, filed April 2024.

2. **Steven, A.**, Rodriguez, M., Park, J. "Thermal Management System for High-Energy Density Battery Packs." US Patent 11,234,567, granted October 2023.

3. Kumar, S., **Steven, A.**, Johnson, R. "Methods for In-Situ Formation of Solid-State Battery Interfaces." US Patent Application 17/987,654, filed January 2023.

4. **Steven, A.**, White, J., Brown, C. "Machine Learning-Based Battery State Estimation System." US Patent Application 17/876,543, filed September 2022.

5. Taylor, K., **Steven, A.**, Miller, D. "Composite Polymer-Ceramic Electrolyte Manufacturing Process." US Patent 11,098,765, granted March 2021.

6. **Steven, A.**, Thompson, M., Clark, S. "Fast-Charging Protocol for Solid-State Battery Systems." US Patent Application 16/789,012, filed February 2020.

Technology Transfer

- **Licensed Technology**: Sol-gel electrolyte synthesis methods to IonTech Dynamics (2023)
- **Spin-off Company**: Co-founded HybridCell Technologies Inc. (2022)
- **Patent Portfolio**: 6 issued/pending patents in solid-state electrolyte technologies

Research Impact Metrics

- **H-index**: 24 (Google Scholar)
- **Total Citations**: 2,890
- **Research Gate Score**: 38.7
- **ORCID**: 0000-0000-0000-0000 (mock)

Selected Invited Presentations (2020-2025)

Plenary and Keynote Lectures

1. "The Future of Solid-State Batteries: Materials Challenges and Opportunities"
   2024 International Conference on Solid State Ionics, Boston, MA (Plenary)

2. "AI-Driven Materials Discovery for Next-Generation Energy Storage"
   2024 Gordon Research Conference on Batteries, Ventura, CA (Keynote)

3. "Thermal Safety in Next-Generation Battery Systems"
   2023 Battery Safety Summit, San Diego, CA (Keynote)

4. "From Laboratory to Manufacturing: Scaling Solid-State Battery Technologies"
   2023 International Battery Production Conference, Detroit, MI (Plenary)

Distinguished Lectures

1. "Machine Learning Applications in Battery Research"
   2022 ARPA-E Energy Innovation Summit, Washington, DC

2. "Interface Engineering in All-Solid-State Lithium Batteries"
   2022 University of Michigan Materials Science Seminar, Ann Arbor, MI

3. "Solid-State Electrolytes: From Laboratory to Manufacturing"
   2021 Materials Research Society Fall Meeting, Boston, MA

4. "Electrochemical Impedance Spectroscopy of Solid-State Systems"
   2021 Stanford University Energy Seminar, Palo Alto, CA

5. "Advanced Characterization of Battery Interfaces"
   2020 MIT Energy Initiative Seminar, Cambridge, MA

6. "Computational Design of Solid-State Battery Materials"
   2020 Argonne National Laboratory Colloquium, Lemont, IL

International Presentations

1. "Multi-Scale Modeling of Ion Transport in Solid Electrolytes"
   2024 International Meeting on Lithium Batteries, Seoul, South Korea

2. "Polymer-Ceramic Composite Electrolytes for Electric Vehicles"
   2023 European Battery Conference, Stockholm, Sweden

3. "Safety Considerations in Solid-State Battery Design"
   2022 Asian Conference on Energy Storage, Tokyo, Japan

Workshop Organization

- **Co-Organizer**: "Solid-State Battery Manufacturing Workshop" (2024)
- **Organizer**: "AI in Battery Research Symposium" (2023)
- **Co-Organizer**: "Interface Engineering in Energy Storage" Workshop (2022)
- **Organizer**: "Young Investigators in Battery Science" Session, ECS Meeting (2021)

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