

Curriculum Vitae

University of Idaho

Name: Dakota Roberson

Title: Assistant Professor

Department: Electrical & Computer Engineering

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Office Location and Campus Zip:

Center for Advanced Energy Studies

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Idaho Falls, ID 83274

UI EMPLOYMENT INFORMATION

- **Date of First Employment at the University of Idaho:** August 14, 2017
- **Date of Tenure:** Untenured
- **Date of Present Rank:** August 14, 2017
- **Leave of Absence for Government Service:** August 2019 – August 2020
- **Engineering License:** Engineer in Training (EIT), 2013

ACADEMIC APPOINTMENTS

- **University of Idaho**
Assistant Professor, Electrical & Computer Engineering
Idaho Falls, ID
Aug. 2017 - Present
- **Center for Advanced Energy Studies**
Associate Member
Idaho Falls, ID
Aug. 2017 - Present
- **University of Idaho**
Affiliate Faculty, Nuclear Engineering
Idaho Falls, ID
Sept. 2018 - Present
- **University of Wyoming**
Graduate Research Assistant
Laramie, WY
Aug. 2013 - May 2017

NON-ACADEMIC EXPERIENCE & CONSULTING

- **Chrysalis Energy Systems, LLC**
Advisor to the Board of Directors
Wilmington, NC
Jan. 2019 - August 2019
- **Aktzin Systems**
Principal Consultant, Power Systems and Circuit Design
Laramie, WY & Idaho Falls, ID
May 2017 - August 2019
- **Sandia National Laboratories (Lockheed Martin Corp.)**
Electric Power Systems Research, R&D Engineering, Intern
Albuquerque, NM
May 2013 - May 2017

EDUCATION

- **University of Wyoming**
Doctor of Philosophy, Electrical Engineering
Laramie, WY
Aug. 2013 – May 2017
 - **Dissertation:** *On Loop-Shaped HVDC Wide-Area Damping Control*
 - **Graduate Minor:** Statistics
- **University of Wyoming**
Bachelor of Science, Electrical Engineering; Cum Laude; Hons.
Laramie, WY
Aug. 2009 – May 2013
 - **Specialization:** Power System Analysis
 - **Minor:** Mathematics

• **Peer Reviewed:**

1. **D. Roberson** and J. F. O'Brien, "Asymmetric Dual Sensor Latency in Distributed Control," *IEEE Transactions on Power Systems*, vol. 34, pp. 4533–4541, Nov 2019
2. A. Al Rashdan and **D. Roberson**, "A Frequency Domain Control Perspective on Xenon Resistance for Load Following of Thermal Nuclear Reactors," *IEEE Transactions on Nuclear Science*, vol. 66, pp. 2034–2041, Sep. 2019
3. J. Hatton, **D. Roberson**, B. Johnson, and R. Nuqui, "Multi-terminal VSC HVDC Cyberattack Detection and Mitigation," in *2019 IEEE Power Energy Society General Meeting*, To Be Presented August 2019
4. N. Kharadia and **D. Roberson**, "Design & modeling of a micro-reactor power plant for a military base," in *2019 American Nuclear Society Student Conference*, January 2019
5. **D. Roberson** and J. F. O'Brien, "Variable loop gain using excessive regeneration detection for a delayed wide-area control system," *IEEE Transactions on Smart Grid*, vol. 9, pp. 6623–6632, Nov 2018
6. **D. Roberson** and J. F. O'Brien, "A Feedback Perspective on Forced Oscillation/Small-Signal Stability Discrimination," in *2018 IEEE Power Energy Society General Meeting (PESGM)*, pp. 1–5, Aug 2018
7. **D. Roberson** and J. F. O'Brien, "Loop-shaping methods for multivariable control design for stability augmentation and oscillation rejection in wide-area damping using hvdc," *Elsevier Electric Power Systems Research*, vol. 157, pp. 238–250, April 2018
8. **D. Roberson** and J. F. O'Brien, "A comparison of hvdc damping controllers in the western north american power system," in *2017 IEEE Power Energy Society General Meeting*, pp. 1–5, July 2017
9. **D. Roberson** and J. F. O'Brien, "Transient stability augmentation with excessive regeneration detection in a delayed wadc," in *2017 IEEE Transportation Electrification Conference and Expo (ITEC)*, pp. 311–316, June 2017
10. **D. Roberson** and J. F. O'Brien, "Loop shaping of a wide-area damping controller using hvdc," *IEEE Transactions on Power Systems*, vol. 32, pp. 2354–2361, May 2017
11. **D. Roberson** and J. F. O'Brien, "Coupling analysis & preliminary mimo control design for wide-area damping using hvdc," in *2016 North American Power Symposium (NAPS)*, pp. 1–6, Sep. 2016

• **Magazine Articles:**

1. **D. Roberson** et al., "Improving Grid Resilience Using High-Voltage DC: Strengthening the Security of Power System Stability," *IEEE Power and Energy Magazine*, vol. 17, pp. 38–47, May 2019

• **Book Chapters, Pending:**

1. **D. Roberson** et al., *Pumped Storage Hydropower Valuation Guidebook: A Cost-Benefit and Decision Analysis Valuation Framework (Chapter 5)*. Argonne National Laboratory, 2019

• **Reports:**

1. **D. Roberson**, J. Ellison, D. Bhatnagar, and D. A. Schoenwald, "Performance of assessment of the pnm prosperity electricity storage project: A study for the doe energy storage systems program," *Sandia National Laboratories, SAND2014-2883*, May 2014

• **Peer Reviewed, Pending:**

1. J. Bell, N. Kharadia, and **D. Roberson**, "Fuel Supply Chains in the Western Interconnect: Evaluating Availability During Extreme Weather Events," in *2019 Energy Policy Research Conference*, Submitted March 2019
2. N. Kharadia, J. Bell, R. A. Borrelli, and **D. Roberson**, "Risk Assessment of a Regional Transmission Operator in the Western Interconnect," in *2019 Energy Policy Research Conference*, Submitted March 2019
3. J. Peterson, R. A. Borrelli, and **D. Roberson**, "Informing Electrical Grid Policy with a Nuclear Power Plant Simulator (working title)," in *2019 Energy Policy Research Conference*, Submitted March 2019
4. J. F. O'Brien, **D. Roberson**, and D. A. Schoenwald, "Sensor / Actuator Colocation in Distributed Power System Control," *IEEE Transactions on Power Delivery*, Submitted July 2019

• **In Preparation:**

1. J. F. O'Brien and **D. Roberson**, "Synchrophasor spoofing detection and remediation for wide-area control," *IEEE Transactions on Power Systems*, in preparation 2019

2. J. Bell and **D. Roberson**, "Hierarchical Inference and Spoofing Alarm in HVDC Control Systems," *IEEE Transactions on Smart Grids*, in preparation 2019
3. J. F. O'Brien, **D. Roberson**, and D. A. Schoenwald, "Energy Storage Actuation for Wide-Area Damping," *IEEE Transactions on Power Systems*, in preparation 2019

• **Conference Presentations:**

1. IEEE Power & Energy Society General Meeting. "Variable Loop Gain using Excessive Regeneration Detector for a Delayed Wide-area Control System", 2018
2. IEEE Power & Energy Society General Meeting. "Loop Shaping of a Wide-area Damping Controller Using HVDC", 2017
3. IEEE Power & Energy Society General Meeting. "Asymptotic Cramér-Rao Lower Bound AR(2) Process, Poster Presentation", 2015

• **Patents:**

1. **D. Roberson** and J. F. O'Brien, "Variable Loop Gain Using Excessive Regeneration Detection for a Delayed Wide-Area Control System, US Patent No.: 10,355,485 B2," *U.S. Patent & Trademark Office*, Jul. 16, 2019

• **Awards:**

- *Advances in Engineering*, Featured Paper Selection (F'2018)
- Nicholson Power Systems Engineering Fellowship (F'2014-F'2015)

• **Grants Awarded:**

1. U.S. Department of Energy Scientific Infrastructure Support for Consolidated Innovative Nuclear Research (CINR), *Co-PI: \$285,763*. "NuScale Simulator at the Center for Advanced Energy Studies", 2019. PI: Richard N. Christensen; Co-PIs: R. A. Borrelli, Michael G. McKellar, Michael Haney, David Arcilesi
2. Energy Policy Institute (EPI) / Battelle Energy Alliance , *PI: \$26,679*. "Value of Power System Stability Services, with Emphasis on Valuation of Proposed Pumped Storage Hydropower", June 2019 - Sept. 2019
3. Office of Research & Economic Development, University of Idaho , *PI: \$35,645*. "Electronics For Frequency-Domain Feedback (EF3): A Laboratory for Brushless DC Motor Control", May 2019 - April 2019
4. Battelle Energy Alliance , *PI: \$56,000*. "Indoor Positioning of Drones", March 2019 - Sept. 2019
5. Battelle Energy Alliance , *PI: \$24,911*. "Developing Electric Vehicle Charging Control Strategies for Extreme Fast Charging (XFC) Sites", March 2019 - Sept. 2019
6. Battelle Energy Alliance , *PI: \$45,794*. "Dynamic Earth Energy Storage: Terawatt-Year, Grid-Scale Energy Storage using Planet Earth as a Thermal Battery (GeoTES)", Oct. 2018 - Sept. 30, 2019. Partners: Lawrence Berkeley National Laboratory, Rocky Mountain Power, Palo Verde Nuclear Generating Station, University of Wyoming
7. Center for Advanced Energy Studies (CAES) / Battelle Energy Alliance , *PI: \$20,000*. "Engineering and Design of Cyber-physical Energy Control Systems", May. 2018 - Sept. 2018
8. Design Magnitude, LLC, *PI: \$4,000*. "Advanced Multirotor Drone Design", Sept. 2018 - May. 2019
9. U.S. Department of Energy, ABB, *Co-PI: \$249,992*. "Cyber Attack Resilient HVDC System", Oct. 2017 - Sept. 2019. PI: Brian K. Johnson; Partner Institutions: Argonne National Laboratory, University of Illinois Urbana-Champaign
10. Fisher Innovation Challenge, *PI: \$25,000*. "Aktzin Control Systems: Grid-Scale Energy Storage Control Systems", Jan. 2017 - Aug. 2017
11. Energy Leadership Summit, *PI: \$2,000*. "Silicon Valley Leadership Seminars", 2016

• **Grant Proposals Under Review:**

1. Idaho Global Entrepreneurial Mission, State of Idaho, *Co-PI: \$1,997,860*. "Cyber Physical Systems Security Institute", submitted 2019. Partner: Boise State University
2. National Science Foundation, *PI: \$297,006*. "AMPS: Bayesian Inference in a Nonlinear Dynamic Compensation Framework", submitted 2019. Partner: West Virginia University

3. Avista Corporation, *Co-PI: \$79,877*. “Asset Health Management for Avista System”, submitted 2019

- **Grant Proposals in Preparation:**

1. National Science Foundation, *PI*. “EPCN: Wide-area Control Learning Archetypes Responsive to Compensator Output”, 2020. Partner: University of Wyoming

- **Unfunded Grant Proposals:**

1. Battelle Energy Alliance , *Co-PI: \$2,500,000 (\$200,000 as University PI)*. “Flexible Geothermal Power Generation Utilizing Geologic Thermal Energy Storage”, Sept. 2019 - July, 2021. Partners: Lawrence Berkeley National Laboratory, PacifiCorp, Arizona Public Services, University of Wyoming, National Renewable Energy Laboratory
2. U.S. Department of Energy, *PI: \$672,489*. “Embedded Precursor Detection in Synchrophasor Measurements: A Data-Driven Approach”, 2019. Partner: George Mason University
3. National Science Foundation: Harnessing the Data Revolution (HDR), *PI*. “NSF HDR Ideas Labs (I-DIRESE-IL): Data-Intensive Expansion of Automatic Control Systems (preproposal)”, 2019
4. National Science Foundation, *Co-PI: \$824,139*. “CPS: Medium: Collaborative Research: An Integrated Sensor-Drone-Satellite Analyzer System to Enhance Soil-Crop Health”, 2018. Partner: Idaho State University
5. Battelle Energy Alliance, *PI*. “Laboratory Directed R&D: INL/CAES - University of Idaho Pilot Program for Encouraging Domestic Students to Pursue Advanced Academic Degrees in Power Systems Engineering”, 2018
6. U.S. Air Force Research Laboratory, *PI: \$416,738*. “Reconfigurable Feedback Control for Multiscale Structures Subject to Non-stationary Conditions”, 2018
7. Alfred P. Sloan Foundation, *Co-PI: \$241,343*. “Smart Asset Health Management for Electric Power Systems”, 2018
8. U.S. Department of Energy, *Co-PI: \$749,786*. “Visualization of Dynamic Systems in the Computer Assisted Virtual Environment: A Collaborative Research Venture at the Center for Advanced Energy Studies”, 2018
9. U.S. Department of Energy, *PI: \$200,000*. “ARPA-E: HomeBase Energy Management System for the Nanogrid”, 2018. Partner: InergyTech
10. Avista Corporation, *Co-PI: \$79,877*. “Asset Health Management for Avista System”, 2018
11. Idaho Department of Commerce IGEM, *Co-PI: \$240,000*. “HomeBase with 6kW GaN Split Phased Inverter”, 2018. InergyTech
12. U.S. Department of Energy, Office of Fossil Energy, *PI: \$312,416*. “Innovative AVR and Electronic Excitation Strategies for Synchronous Machines”, 2018. Partner: University of Wyoming
13. University of Idaho Office of Research & Economic Development, *PI: \$11,944*. “Seed Grant: Cyber-Physical Systems Reverse Engineering and Forensics Laboratory”, 2018
14. U.S. Department of Energy, SunShot, *Co-PI: \$600,000*. “SETO: Integrated Front-End Control and Back-End Analytics for Solar PVs”, 2018. Partner: Idaho National Laboratory
15. NASA Idaho Space Grant Consortium, *PI: \$47,552*. “High-Performance Control and Automation Education for Underrepresented Student Recruitment and Retention”, 2017
16. National Science Foundation, *PI: \$616,816*. “EPCN: Cyber-Physical Learning Paradigms Responsive to Feedback Compensator Output”, 2017. Partner: University of Wyoming
17. National Science Foundation, *Co-PI: \$298,684*. “SaTC: EDU: Cyberphysical systems Forensics and Reverse Engineering Lab and Curriculum Development”, 2017
18. U.S. Office of Naval Research, *PI: \$788,350*. “Learning Paradigms Responsive to Feedback Compensator Output”, 2017. Partner: University of Wyoming
19. U.S. Department of Energy, *PI: \$125,000*. “ARPA-E: Advanced Control Systems for Distributed Power Systems”, 2017. Partner: University of Wyoming

TEACHING ACCOMPLISHMENTS

- **University of Idaho**

Areas of Specialization: Power Systems, Automatic Control Systems

- **Courses Taught:**

- * Advanced Frequency-Domain Control, ECE 504, (S’2018)
- * Power System Stability, ECE 521, (F’2017, S’2019)

- * Control Systems, ECE 470 / ME 481, (F'2018)

- **Graduate Students Advised:**

- * Kendall Bean, M.S.E.E., (F'2019 - Present)
- * Steven Phillips, M.S.E.E., (F'2019 - Present)
- * John Bell, M.S.E.E., (F'2018 - Present)
- * Nephi Kharadia, M.S.E.E., (F'2018 - Present)
- * Arthur Peck, M.S.E.E., (F'2018-Present)
- * Michael L. Pokallus, M.S.E.E. (S'2018 - Present)
- * Kimberly A. Cattelan, M.E.E.E. (S'2018 - Present)

- **Graduate Student Committee Service:**

- * Kelley Verner, Ph.D., (Expected Grad. S'2020)
- * Robert L. Cloud, Ph.D., External (Expected Grad. S'2020)
- * Don Scofield, M.S.E.E., (Graduated S'2019)
- * Jessica Hatton, M.S.E.E., (Graduated S'2018)
- * David Arnett, M.S.E.E., (Graduated S'2018)

- **Undergraduate Student Project Sponsorship:**

- * 5 Student Team, B.S. Electrical Engineering Capstone Design: "Advanced Multirotor Drone Design", (F'2018-S'2019)
- * 4 Student Team, B.S. Mechanical Engineering Capstone Design: "Small-scale Maximum Power Point Tracking Photovoltaic System", Brigham Young University - Idaho (S'2018)

- **Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:**

- * Invited Lecture: Idaho National Laboratory Energy Storage and Electric Vehicles Group "High-Performance Control Strategies" (S'2019)
- * Invited Lecture: ECE Undergraduate Students at University of Idaho: "The Versatility of Energy Detection", Moscow, ID. (F'2018)
- * Invited Lecture: Codebreakers CAES Seminar Series: "Power System (In)Stability in the West", Idaho Falls, ID. (S'2018)
- * Invited Lecture: to ECE Undergraduate Students at University of Idaho: "High-Performance Wide-Area Damping Control", Moscow, ID. (F'2017)
- * Invited Lecture: IEEE Eastern Idaho Section: "Brew with the Crew: Innovations in Energy Detection", Idaho Falls, ID. (F'2018)
- * Guest Lecturer: Resilient Control of Critical Infrastructure, ECE469, (F'2017, F'2018)

- **University of Wyoming**

Areas of Specialization: Power Systems, Signal Processing

- **Courses Taught:**

- * Digital Signal Processing (partial), ECE 4220, (F'2015)
- * Electromechanics Laboratory, ECE 5410, (F'2013)
- * Orientation to Engineering (TA), ES 1000, (F'2011, S'2012)

- **Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:**

- * "On Loop-Shaped HVDC Wide-Area Damping Control", Faculty & Graduate Student Seminar on wide-area control, ECE Department, University of Wyoming, (S'2017)
- * "The System", Faculty & Graduate Student Seminar on the western North American Power System, ECE Department, University of Wyoming, Laramie, WY (F'2015)
- * "A Cool Way to Spend Your Summer", Presentation to IEEE Student Chapter, University of Wyoming RE: Research at Sandia National Labs, Laramie, WY (F'2013)

- **Professional and Scholarly Organizations:**

- Tau Beta Pi
 - * Member (2012 - present)
 - * Chairperson (2013 - 2016)
 - * President WY-A (2014 - 2015)
- Institute of Electrical and Electronics Engineers (IEEE)
 - * Member (2010 - present)
- IEEE Power & Energy Society
 - * Member (2011 - present)
- Scholastic Peer Review:
 - * *IEEE Transactions on Industrial Informatics*
 - * *IET Generation, Transmission & Distribution*
 - * *IEEE Transactions on Power Systems*
 - * *Elsevier Electric Power Systems Research*
 - * *IEEE PES General Meeting*

- **Awards:**

- Tau Beta Pi Outstanding Member (2015-2016)

- **Major Committee Assignments:**

- Founder and Coordinator, *Codebreaker: CAES Seminar Series*, Multi-institutional (F'2017-present)
- ECE Power Systems Committee; Departmental (F'2017-present)
- ECE Chair Search Committee; Departmental (S'2019)
- ECE Interim Chair Search Committee; Departmental (F'2018)
- Computer Science IGEM Faculty Search; College (S'2018)
- Dean's Academic Dishonesty Appeal Panel Chairperson; University of Wyoming, College (2013-2017)
- College of Engineering & Applied Sciences Ambassador; University of Wyoming, College (2012-2017)

- **Outreach Service:**

- Invited Lecture: Brigham Young University - Idaho IEEE and ASME Student Sections: "The Versatility of Energy Detection", Rexburg, ID (S'2018)
- Invited Lecture: Rock Springs High School, Rock Springs, WY: "Power Systems at UWYO" (S'2015,S'2016)
- Invited Lecture: *A Study for the DOE Energy Storage Systems Program*, Albuquerque, NM and Livermore, CA: "Performance Assessment of the PNM Prosperity Electricity Storage Project" (F'2014)

- **Continuing Education:**

- Sunnylands Media Training (Nov. 2019)

- **Community Engagement:**

- Snake River Cutthroats Fly Fishing, Member (2017 - present)
- Blackfoot River Bowmen, Member (2018 - present)
- High Plains Archery Club
 - * President (2016-2017)
 - * Vice President (2015-2016)
 - * Member (2013-2017)
- Laramie Dirt Riders Motocross Club
 - * President (2015-2016)
 - * Member (2011-2017)
- Albany County Sheriff's Office Search & Rescue (2015-2017)
 - * First Aid and Wilderness Responder Training