Curriculum Vitae
Tarannom Parhizkar

CONTACT INFORMATION

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LinkedIn | ResearchGate

EDUCATION

2017	**Ph.D., Energy Systems Engineering** Sharif University of Technology, Tehran, Iran
2012	**M.S., Energy Systems Engineering** Sharif University of Technology, Tehran, Iran
2010	**B.S., Mechanical Engineering** K.N.Toosi University of Technology, Tehran, Iran

POSITIONS

2023 – Present	**Senior Advisor,** Southern California Edison, Los Angeles
2022 – Present	**Assistant Research Scientist,** University of California, Los Angeles
2022 – 2023	**Adjunct Professor,** Coconino Community College, Arizona
2021 – 2022	**Adjunct Professor,** Moorpark College, California
2020 – Present	**Lecturer,** University of California, Los Angeles (UCLA)
2020 – 2022	**Assistant Project Scientist,** University of California, Los Angeles
2018 – 2020	**Postdoctoral Fellow,** Norwegian University of Science and Technology, Trondheim, Norway
2017 – 2018	**Senior Research Scientist,** Sharif Energy Research Institute, Tehran, Iran
2017 – 2018	**Assistant Professor,** AmirKabir University of Technology-Tehran Polytechnic, Tehran, Iran

RESEARCH AREAS

Fault Detection, Diagnosis, and Prognostic Health Monitoring of Complex Systems

- Development of a data-driven Prognostic Health Monitoring (PHM) and Energy Management Information System (EMIS) framework to monitor health status and energy consumption of complex systems in real-time.
- Assistance in operation of the Fuel Cell Condition Monitoring Lab at Energy Engineering department.
- Development of software platform for fault detection and Remain Useful Lifetime (RUL) prediction of heating systems.
- Root cause analysis of abnormal energy consumption in different industry sectors and development of software tools for fault detection and energy optimization of a case study.

- Review of data-driven and principle-based degradation models.
- Failure mode and effects analysis (FMEA) of dynamic positioning systems (reference, computer, propulsion, control, and power components).
- Analysis and review of causal cognition models in complex systems to assist operators in emergencies.

Risk Assessment and Management

- Leading the system level assessment team on a California Energy Commission (CEC) funded project titled "Pilot Testing and Assessment of Safety and Integrity of Targeted Hydrogen Blending in Gas Infrastructure for Decarbonization."
- Leading a team of 10 researchers and students tasked with the development of a wildfire risk and resilience assessment methodology and software platform for power grid in California.
- Leading a team working on the development of an enhanced version of the Accident Dynamics Simulator paired with Information, Decision, and Action in a Crew (ADS-IDAC) engine, in collaboration with our research partner Norwegian University of Science and Technology (NTNU).
- Development of an online risk management engine applicable to decision support tools using machine learning algorithms.
- Research on climate adaptation and resilience improvement plans for the electricity sector.
- Prioritizing the locations to install distributed power generation units for improving the grid resilience.

System Optimization

- Condition-based operation optimization of proton-exchange membrane fuel cell.
- Condition based maintenance and operation optimization framework for power plants.
- Development of a sensor placement optimization engine to assist decision support tools in oil and gas networks.
- Development of data-driven degradation models and optimization algorithms under uncertainty.
- Development of a sensor placement optimization software.
- Optimizing the size of distributed power generation units such as stand-alone PV systems and batteries to meet the demand in a cost-effective way.
- Real-time operating condition optimization of PV-systems and batteries during power shutoff.

TEACHING EXPERIENCES

- Developed and instructed course "Solar Water Heating Systems", Coconino Community College, Arizona, Spring 2022.
- Developed and instructing course "Introduction to Photovoltaic Systems", Moorpark College, California, Spring 2022.
- Co-developed and Instructed "Failure Mechanisms Fundamentals" course, University of California, Los Angeles (UCLA), Spring 2021- Spring 2023.
- Developed course "Renewable Energy System Modeling", AmirKabir University of Technology-Tehran Polytechnic, Tehran, Iran, Fall 2018.
- Developed and instructed the course "Cogeneration Systems", AmirKabir University of Technology-Tehran Polytechnic, Tehran, Iran, Spring 2018.
- Developed and instructed the course "Energy Conversion Systems", AmirKabir University of Technology-Tehran Polytechnic, Tehran, Iran, Fall 2017.

ACADEMIC SUPERVISING

2022 – 2023 **Co-Supervisor,** Polytechnic University of Milan, Italy

- Vittorio Casucci, M.S. thesis on "Resilience Assessment and Management of Power Grids in Response to Extreme Weather Conditions (Heat Wave, Storm, Flood, Wildfire, Etc.)".
- Rouzbeh Shirvani, M.S. thesis on "Assessing and improving the climate resilience of an electricity system".

2018 – 2020 **Co-Supervisor,** Norwegian University of Science and Technology, NTNU, Trondheim, Norway

- Jon Bakke Thorkildsen, M.S. thesis on "Technical, Environmental and Economical Feasibility Analysis of Using Fuel Cells with Hydrogen as Fuel on a Purse Seiner/Pelagic Trawler".
- Tor Magnus Michaelsen, M.S. thesis on "Sizing Optimization of a Hybrid Shipboard Power System for Low-Emission Shipping".

2016 – 2018 **Co-Supervisor,** Sharif University of Technology, Tehran, Iran

- Elham Rafieapour, M.S. thesis on "Comparison Between Machine Learning Techniques and Simulation Methods for Predictive Analysis of Energy Systems".
- Ali Gharavi, M.S. thesis on "Optimal Data-Driven Maintenance Scheduling Framework for Cooling Towers in Steel Processing Plant".
- Saeed Esbati, M.S. thesis on "Fault Detection and Diagnosis for Condition-Based Maintenance of Air Handling Units By MATLAB/Rapidminer Programming".
- Fereshteh Aramoun, M.S. thesis on "Remaining Useful Life Predictions of Boilers Based on Data-Mining Methods By MATLAB/SPSS Programming".

PROFESSIONAL ACTIVITIES

2020 – Present **International Collaborator,** Centre for Research-based Innovation (SFI), Norwegian University of Science and Technology (NTNU), Norway.

2020 – Present **Fundraising Committee Member,** The Council on Women in Energy & Environmental Leadership (CWEEL) Fundraising Committee, USA.

2019 – Present **Council Member,** Standards and Practices Council, RIMS | The Risk Management Society, USA.

2019 – 2020 **Mentor,** Women of Renewable Industries and Sustainable Energy (WRISE) mentorship program.

2016 – 2017 **Student Ambassador,** The Second International Conference on Battery and Fuel Cell Technology, Rome, Italy, 2017.

2012 – Present **Reviewer**

- Outstanding Reviewer, Journal of Energy Conversion and Management, Elsevier.
- Reviewer, Sustainable Energy Technologies, and Assessments
- Reviewer, The European Journal of Health Economics, Springer.
- Reviewer, Current Genomics Journal, Bentham Science.
- Reviewer, Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability, SAGE.
- Reviewer, Process Safety and Environmental Protection, Publication of the Institution of Chemical Engineers, Elsevier.
- Reviewer, World Electrical Vehicle Journal, Multidisciplinary Digital Publishing Institute (MDPI).
- Reviewer, Ships and Offshore Structures, Taylor & Francis.
- Reviewer, Sustainable Energy Technologies, and Assessments

PROFESSIONAL MEMBERSHIPS

- Professional Risk Managers' International Association
- Word Academy of Science, Engineering and Technology (WASET)
- Member of American Energy Society
- Fellow Member of Sharif Energy Research Institute (SERI)
- Society for Risk Analysis (SRA)
- Member of Association of Energy Engineering (AEE)
- Member of World Society of Sustainable Energy Technologies
- Member of American Energy Society
- Women of Renewable Industries and Sustainable Energy (WRISE)
- Member of US Green Building Council, Los Angeles Chapter
- Women in Energy & Environmental Leadership (CWEEL)

CONFERENCE ORGANIZING

- **Management Committee Member,** 70th Reliability and Maintainability Symposium (RAMS) Management, New Mexico, United States, 2024.
- **International Workshop Organizer,** Energy Transition to Net-Zero Workshop on Reliability, Risk, and Resilience, 33rd European Conference on Safety and Reliability (ESREL), Southampton, United Kingdom, 2023.
- **Session Organizer,** Energy Sector Adaptation & Climate Change Vulnerability Assessment Session, 32nd European Conference on Safety and Reliability (ESREL), Dublin, Ireland, 2022.
- **Session Organizer,** Infrastructure Sustainability and Resiliency Session, 29th International Symposium on Sustainable Systems and Technology (ISSST), Pittsburgh, PA, 2022.
- **Session Organizer,** Wildfire Risk Assessment & Management Session, 16th Probabilistic Safety Assessment & Management Conference, Honolulu, Hawaii, USA, 2022.
- **Session Organizer,** Waste Heat Recovery and Energy Storage Technologies Session, American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Norway, 2018.
- **Session Organizer,** Advances in Turbine and Boiler Systems: Design and Inspection Session, American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Charlotte, NC, USA, 2017.
- **Session Organizer,** Gas Turbine and CHP Management and Fault Diagnosis, along with Gas Distribution Network Max Flow Prediction Modeling Session, American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Charlotte, NC, USA, 2017.
- **Session Organizer, Clean-Coal:** Ultra-Hi Efficiency Low Emission (U-HELE) Session, American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Charlotte, NC, USA, 2017.
- **Session Organizer,** Revolution to End Energy Poverty (REEP) Session, American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Charlotte, NC, USA, 2017.

PUBLICATIONS AND PRESENTATIONS

Guest Editor

- "Risk Assessment and Management in Complex Marine Systems", **Journal of Marine Science and Engineering**, 2022.

Books

- **T. Parhizkar**, T. Stewart, L. Huang, A. Mosleh. (2023) Degradation and Failure Mechanisms of Complex Systems: Principles. In: Garg, H. (eds) Advances in Reliability, Failure and Risk Analysis. Springer, Singapore.
- **T. Parhizkar**, J. E. Vinnem, I. B. Utne, "Online Risk Assessment of Complex Automated Maritime Systems, Principles, Modelling and Applications", Springer, ISBN 987-3-030-88098-9, 2022.
- **T. Parhizkar**, "Long Term Degradation Based Modeling and Optimization Framework", Book Chapter, IGI Global Publisher, 2017.

Journal Papers

1. R.G. Maidana., **T. Parhizkar**, G. Martin; I. B. Utne. (2023). Dynamic Probabilistic Risk Assessment Scenario Generation with K-Shortest-Paths Planning, **Reliability Engineering & System Safety**, 109725.
2. P. Najafi., O. Kohnehpooshi., A. Hedayatnasab., & T. Parhizkar. (2023). Fire-resistance behavior of concrete columns produced with recycled ceramic and silica aggregates: An experimental and numerical approach. **Construction and Building Materials**, 390, 131774.
3. H. Ahrafi, **T. Parhizkar**. (2023). Electricity Sector Resilience in Response to Extreme Weather and Climate-Related Events: Tools and Datasets, **The Electricity Journal**, 36(6), 107290.
4. R.G. Maidana., **T. Parhizkar**, A. Gomola, I.B. Utne, & A. Mosleh. (2022). Supervised dynamic probabilistic risk assessment: Review and comparison of methods. **Reliability Engineering & System Safety**, 108889.
5. H. Nejad, **T. Parhizkar**, A. Mosleh, Automatic Generation of Event Sequence Diagrams for Guiding Simulation Based Dynamic Probabilistic Risk Assessment (SIMPRA) of Complex Systems, **Reliability Engineering and System Safety**, 2021.
6. Y. Hu, **T. Parhizkar**, A. Mosleh, Guided Simulation for Dynamic Probabilistic Risk Assessment of Complex Systems: Concept, Method, and Application, **Reliability Engineering and System Safety**, 2021, 108047.
7. **T. Parhizkar**, J. E. Vinnem, I. B. Utne, A. Mosleh, "Dynamic Probabilistic Risk Assessment of Decision-Making in Emergencies for Complex Systems Case Study: Dynamic Positioning Drilling Unit", **Ocean Engineering**, 2021, 237.
8. S. Hongenboom, **T. Parhizkar**, J. E. Vinnem, "Temporal Decision-Making Factors in Risk Analyses of Dynamic Positioning Operations", **Reliability Engineering and System Safety**, 2021, 207.
9. **T. Parhizkar**, E. Rafieapour, A. Parhizkar, "Evaluation and Improvement of Energy Consumption Prediction Models Using Principal Component Analysis (PCA)-Based Feature Reduction", **Journal of Cleaner Production**, 2021, 279.
10. **T. Parhizkar**, J. E. Vinnem, I. B. Utne, A. Mosleh, "Supervised Dynamic Probabilistic Risk Assessment of Complex Systems, Part 1: General Overview", **Reliability Engineering and System Safety**, 2020, 208.
11. **T. Parhizkar**, J. E. Vinnem, I. B. Utne, A. Mosleh, "Supervised Probabilistic Risk Assessment of Complex Systems, Part 2: Application to Risk-Informed Decision Making, Practice and Results", **Reliability Engineering and System Safety**, 2020, 208.
12. **T. Parhizkar**, J. E. Vinnem, I. B. Utne, "Data Driven Approach to Risk Management and Decision Support for Dynamic Positioning Systems", **Reliability Engineering and System Safety**, 2020, 201.
13. **T. Parhizkar**, F. Aramoun, "Efficient Health Monitoring of Buildings Using Failure Modes and Effects Analysis (FMEA), Case Study: Air Handling Unit (AHU) System", **Journal of Building Engineering,** 2020, 29, 101113.

14. **T. Parhizkar**, F. Aramoun, S. Esbati, Y. Saboohi, "Efficient Performance Monitoring of Building Central Heating System Using Bayesian Network Method", **Journal of Building Engineering**, 2019, 100835.

15. A. F. Sotoodeh, **T. Parhizkar**, M. Mehrgoo, M. Ghazi, M. Amidpour, "Aging Based Design and Operation Optimization of Organic Rankine Cycle Systems", **Energy Conversion and Management**, 2019, 199, 111892.

16. **T. Parhizkar**, S. Balali, A. Mosleh, "An Entropy based Bayesian Network Framework for System Health Monitoring", **Entropy**, 2018, Volume 20, pp. 416.

17. **T. Parhizkar**, S. Hafeznezami, "Degradation based Operational Optimization Model to Improve the Productivity of Energy Systems, Case Study: Solid Oxide Fuel Cell Stacks", **Energy Conversion and Management**, 2018, Volume 158, pp. 81-91.

18. S. Hafeznezami, ..., **T. Parhizkar** & J. Jay, "Remediation of Groundwater Contaminated with Arsenic Through Enhanced Natural Attenuation: Batch and Column Studies", **Water Research**, 2017, 122, 545-556.

19. **T. Parhizkar**, R. Roshandel, A. Mosleh, "Aging based Optimal Scheduling Framework for Power Plants using Equivalent Operating Hour Approach", **Applied Energy**, 2017, Volume 205, pp. 1345-1363.

20. **T. Parhizkar**, R. Roshandel, "Long Term Performance Degradation Analysis and Optimization of Anode Supported Solid Oxide Fuel Cell Stacks", **Energy Conversion and Management**, 2017, Volume 133, pp. 20-30.

21. R. Roshandel, **T. Parhizkar**, "Degradation based Optimization Framework for Long Term Applications of Energy Systems - Case Study: Solid Oxide Fuel Cell Stacks", **Energy**, 2016, Volume 107, pp. 172-181.

22. P. Hanafizadeh, **T. Parhizkar**, A. Nouri Gheimasi, "Analysis of Micro Recuperators in Small Sized Gas Turbines Regarding Manufacturing Potential of Iran", **Energy Equipment and Systems**, 2015, Volume 3, Issue 1.

23. E. Ezzatneshana, M. Arami, **T. Parhizkar**, A. H. Kordkheili, S. Sattari, "Evaluation of Optimum Performance and Economic Analysis of Micro CHP Systems in Different Sectors in Iran", **International Journal of Energy & Technology**, 2014, Volume 6, Issue 4, pp 1-10.

24. **T. Parhizkar**, R. Roshandel, A. Hosseini, "Degradation Impact on Optimal Conditions of PEM Fuel Cell", **Iranian Chemical Engineering Journal**, 2014, Volume 12, 17-28.

25. R. Roshandel, **T. Parhizkar**, "A New Approach to Optimize the Operating Conditions of a Polymer Electrolyte Membrane Fuel Cell Based on Degradation Mechanisms", **Energy Systems**, 2013, Volume 4, Issue 3, pp 219-237.

26. **T. Parhizkar**, R. Roshandel, A. Tahmasebi, "The Impact of Operational Conditions on Degradation Mechanisms in Polymer Electrolyte Membrane Fuel Cells", **Iranian Journal of Energy**, Volume 15, 2012.

27. **T. Parhizkar**, H. Jafarian, Y. Kialashaki, Y. Saboohi, "The Optimum Design of Motorized PV Shade and Its Impact on Energy Flow of a Case Study", **Iranian Journal of Energy**, Volume 15, 2012.

Conferences

1. J. B. Arnheim., T. Mortlock., H. Fathima., P. Pataranutaporn., Ahmed, N., A. Tbaileh., & **T. Parhizkar.** (2023, July). Developing a Disaster-Ready Power Grid Agent Through Geophysically-Informed Fault Event Scenarios. In 2023 IEEE Power & Energy Society General Meeting (PESGM) (pp. 1-5). IEEE.
2. G.S.M. Silva., **T. Parhizkar**., H.T. Nguyen., & E.L. Droguett. (2023, January). Quantum-Enhanced Reliability Assessment of Power Networks in Response to Wildfire Events. **2023 Annual Reliability and Maintainability Symposium (RAMS)** (pp. 1-7). IEEE.

3. R. Shirvani, **T. Parhizkar**, A Framework for Resilience Assessment of Electricity Systems, **32nd European Safety and Reliability Conference**, August 2022.
4. F. Fakour, **T. Parhizkar**, R. Ramezani, A. Mosleh, Uncertainty Quantification for Risk and Reliability Analysis: Application in Building Energy Consumption, **The 68th Annual Reliability and Maintainability Symposium**, January 2022.
5. **T. Parhizkar**, A. Mosleh, Guided Probabilistic Simulation of Complex Systems Toward Rare and Extreme Events, **The 68th Annual Reliability and Maintainability Symposium**, January 2022.
6. R. Maidana, **T. Parhizkar**, I. Utne, A. Mosleh, Towards Risk-based Autonomous Decision-making with Accident Dynamic Simulation, **31st European Safety and Reliability Conference**, September 2021.
7. H. Hosseinian, **T. Parhizkar**, A. Mosleh, Simulation Based Probabilistic Risk Assessment (SIMPRA): Risk Based Design, **31st European Safety and Reliability Conference**, September 2021.
8. **T. Parhizkar**, R. Roshandel, A. Mosleh, M. Khoshtinat, "Operation Scheduling Optimization Framework for Gas Turbines Based on System Degradation", The American Society of Mechanical Engineers (ASME) Turbo Expo Conference, Charlotte, NC, USA, 2017.
9. P. Hanafizadeh, **T. Parhizkar**, K. Ghorbanian, "Thermoeconomic Approach for Optimal Design of Gas Turbine Heat Recovery Steam Generator", Proceeding of the 26th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, ECOS, 2013.
10. E. Ezzatneshan, **T. Parhizkar**, M. Arami, "Techno-Economic Assessment of Micro-CHP in Residential and Commercial Buildings in Tehran", Iranian Society of Mechanical Engineers, 2013.

Invited Speaker

- Instructed "**Safe Operation and Maintenance - Degradation based Operation Optimization of Energy Systems**" lecture, Norwegian University of Science and Technology, NTNU, Trondheim, Norway, Fall 2021.
- "**Long Term Degradation-Based Operation and Design Optimization of Complex Energy Systems**", International Symposium on Sustainable Systems and Technology (ISSST), Virtual conference, 2021.
- Instructed "**Dynamic Probabilistic Risk Assessment of Complex Systems**" lecture, Norwegian University of Science and Technology, NTNU, Trondheim, Norway, Fall 2019.
- "**Aging Effects on Fuel Cells Operation Optimization", 4th Hydrogen and Fuel Cell Conference**, Tehran, Iran, 2017.

CERTIFIED TRAININGS

- Commercial Liability Insurance for the Energy Industry, California, USA, 2022.
- Databases and SQL for Data Science, International Business Machines (IBM), New York, USA, 2020.
- Machine Learning, Stanford University, California, USA, 2020.
- Probabilistic Graphical Models 1: Representation, Stanford University, California, USA, 2020.
- Best Practices for Building a New Data Center, Schneider Electric, Energy University, Germany, 2015.

COMPUTER SKILSS

- **Programming:** MATLAB, SQL, PYTHON, EES, GAMS.
- **Applications:** Rapid Miner, SPSS, The Unscrambler, SAPPHIRE, Trilith, GeNIe, Thermoflow, RETScreen, Homer, Carrier, TRNSYS, DesginBuilder, EnergyBIS.