Dr. Prasanna Date

Research Scientist

Computer Science & Mathematics
Oak Ridge National Laboratory
Oak Ridge, Tennessee, USA

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ORNL Webpage
Personal Webpage

Profiles

LinkedIn
Twitter
ResearchGate
ORCID
Google Scholar
GitHub

Interests

- Artificial Intelligence
- Machine Learning
- Deep Learning
- Quantum Computing
- Neuromorphic Computing
- High Performance Computing
- Applied Operations Research

Biography

Dr. Prasanna Date is a Research Scientist at the Oak Ridge National Laboratory (ORNL). He explores AI and machine learning techniques on non-conventional computing platforms such as quantum computing and neuromorphic computing. He obtained his Ph.D. in Computer Science at Rensselaer Polytechnic Institute in 2019. He is a member of AAAI, ACM, APS, IEEE, INFORMS and SIAM.

Experience

Sep 2019–Present — **Research Scientist** — **Oak Ridge National Laboratory, Oak Ridge, TN**

- Part of the Computer Science and Mathematics Division (CSMD).
- Pursued research in quantum computing, neuromorphic computing, artificial intelligence, machine learning and autonomous vehicles; organized conferences and workshops; secured research funding at internal ORNL avenues etc.
- Highlights (till date): 1 workshop paper, 5 conference papers, 3 journal papers (in review), 2 research grants.

May 2019–Sep 2019, Aug 2018–Dec 2018, May 2015–Dec 2017 — **Research Assistant** — **Rensselaer Polytechnic Institute, Troy, NY**

- Worked in the research group of Prof. Christopher D. Carothers.
- Pursued research in neuromorphic computing and deep learning: CoNNTrA training algorithm for neuromorphic spiking neural networks; predicting supercomputer failures using neuromorphic computing; and design index for deep neural networks.
- Highlights: 1 doctoral dissertation, 3 conference papers (1 in review).

Jan 2018–Aug 2018 — **Research Intern** — **Oak Ridge National Laboratory, Oak Ridge, TN**

- Part of the Computational Data Analytics (CDA) Group, mentored by Dr. Robert M. Patton.
- Pursued research in quantum computing and machine learning.
- Highlights: 1 journal paper, 1 conference paper.

Education

2014–2019 — **Ph.D. Computer Science** — **Rensselaer Polytechnic Institute, Troy, NY**
Dissertation: *Combinatorial Neural Network Training Algorithm for Neuromorphic Computing*
Advisor: Prof. Christopher D. Carothers
GPA: 3.9 / 4.0
Neuromorphic Computing | Deep Learning | HPC

2014–2019 — **M.S. Computer Science** — **Rensselaer Polytechnic Institute, Troy, NY**
GPA: 3.9 / 4.0
Machine Learning | Data Mining | Randomized Algorithms

2014–2019 — **M.Eng. Industrial Engineering** — **Rensselaer Polytechnic Institute, Troy, NY**
GPA: 3.8 / 4.0
Operations Research | Combinatorial Optimization

2010–2014 — **B.E. (Honors) Manufacturing Engineering** — **BITS Pilani, India**
Thesis: *Development of Fuzzy PROMETHEE Algorithm for Evaluation of Indian World Class Manufacturing Organizations*
Supervisor: Prof. Abhijeet K. Digalwar
CGPA: 8.0 / 10.0
Algorithm Design | Fuzzy Logic | Supply Chain Management

Skills

Programming & Machine Learning:

- Python, C, C++ ●●●●○
- TensorFlow ●●●●○
- Scikit-learn ●●●●○
- MATLAB, R ●●●○○

Quantum Computing:

- Google, IBM, D-Wave ●●●●○
- Rigetti, Xanadu ●●●○○

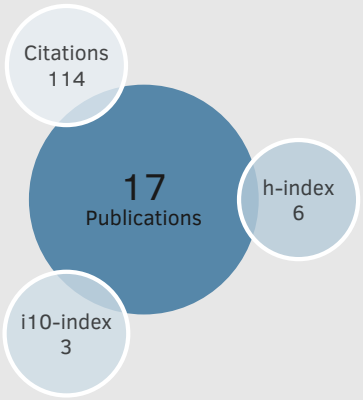
Neuromorphic Computing:

- Intel Loihi ●●●●○
- IBM TrueNorth ●●●●○

Web Development:

- HTML, CSS, JavaScript ●●●○○

Metrics



Memberships

AAAI: Association for the Advancement of Artificial Intelligence

ACM: Association for Computing Machinery

APS: American Physical Society

IEEE: Institute of Electrical and Electronics Engineers

INFORMS: Institute for Operations Research and the Management Sciences

SIAM: Society for Industrial and Applied Mathematics

Languages

English (Fluent)

Hindi (Fluent)

Marathi (Mother Tongue)

Projects

Oct 2020–Sep 2021 — **Autonomous Vehicles** — **ORNL**

- *Description*: Leverage reinforcement learning to drive simulated and small-sized autonomous vehicles. Deep neural networks running on GPUs and spiking neural networks running on Intel Loihi used.
- *Computing Resources*: Summit supercomputer, GPU clusters, Intel Loihi neuromorphic system, Python

Oct 2020–Jun 2021 — **Neuromorphic Algorithm Design** — **ORNL**

- *Description*: Design, implement and validate neuromorphic graph algorithms. Develop theoretical models of neuromorphic computational complexity. Prove Turing-completeness of neuromorphic computing.
- *Resources & Languages*: Intel Loihi neuromorphic system, NEST neuromorphic simulator, Python

Jul2020– Sep 2021 — **Quantum Machine Learning** — **ORNL**

- *Description*: Demonstrate the efficacy of quantum computers to train machine learning models faster than classical computers.
- *Resources & Languages*: IBM, Rigetti and Xanadu quantum computers, Google Cirq, IBM Qiskit, Rigetti Forest, Xanadu PennyLane

Apr 2020–Sep 2020 — **Epidemiological Modeling using Neuromorphic Computing** — **ORNL**

- *Description*: Develop spike-based neuromorphic models for epidemiological simulations of global pandemics such as COVID-19.
- *Resources & Languages*: NEST neuromorphic simulator, Python

Sep 2019–Jun 2020 — **Quantum Artificial Intelligence** — **ORNL**

- *Description*: Leverage quantum computing to design efficient algorithms that can train machine learning models. Leverage quantum computers to address NP-complete problems.
- *Resources & Languages*: D-Wave 2000Q quantum computer, Python

Awards & Grants

June 2021 — **Winner, YSiaN 2021 Competition** — **ORNL**

- *Competition*: Your Science in a Nutshell (YSiaN) 2021 is an intra-ORNL competition, where early career researchers compete against each other by presenting their research in 2 minutes. The best speaker wins the competition.
- *Talk Title*: Advancing Science using Quantum Machine Learning
- *Venue*: ORNL / Virtual

Mar 2021–Sep 2021 — **Award Recipient, AWS Research Credits** — **Amazon AWS**

- *Award*: Awarded **USD 10,000** worth of research credits, which grant access to some of the world's most advanced quantum computers, including D-Wave, Rigetti and IonQ.
- *Title*: Machine Learning Acceleration using Quantum Computing (MAQ)
- *Program*: Amazon AWS (Amazon Web Services) Cloud Credits for Research Program

Mar 2021–Sep 2021 — **Award Recipient, OLCF Quantum Program** — **ORNL**

- *Award*: Access to IBM, Rigetti and Xanadu quantum computers—world's most advanced quantum computers for 6 months
- *Title*: Machine Learning Acceleration using Quantum Computing (MAQ)
- *Program*: ORNL Oak Ridge Leadership Computing Facility (OLCF) Quantum Program

Mar 2021–Mar 2022 — **Award Recipient, OLCF Computing Program** — **ORNL**

- *Award*: Access to Summit supercomputer—world's second largest supercomputer for 1 year
- *Title*: Training deep neural networks (DNNs) to drive autonomous vehicles
- *Program*: ORNL Oak Ridge Leadership Computing Facility (OLCF) Supercomputing Program

Awards & Grants (continued)

Jul 2020– Sep 2021 — **Principal Investigator** — **ORNL**
- *Title*: Machine Learning Acceleration using Quantum Computing (MAQ)
- *Program*: ORNL Laboratory Directed Research and Development (LDRD) Seed Program
- *Amount:* **USD 190,000**

Apr 2020– Sep 2020 — **Co-Principal Investigator** — **ORNL**
- *Title*: Tracking COVID-19 in the Absense of Testing
- *Program*: ORNL Laboratory Directed Research and Development (LDRD) Seed Program
- *Amount*: **USD 190,000**

Leadership Experience

Oct 2021 — **Workshop Chair** — **IEEE QAI 2021 Workshop**
- *Workshop*: Quantum Artificial Intelligence (QAI) Workshop, held as part of the IEEE Quantum Week: IEEE International Conference on Quantum Computing and Engineering (QCE) 2021
- *Venue*: Virtual

Oct 2021 — **Leadership Engagement Chair** — **ORNL**
- *Organization*: The Future Leaders Network at ORNL, which connects early career researchers at ORNL through networking, training and leadership engagement opportunities
- *Responsibilities*: Organized Leadership Panel Series

Jul 2021 — **Organizing Committee Member** — **ICONS 2021 Conference**
- *Conference*: International Conference on Neuromorphic Systems (ICONS) 2021
- *Venue*: Virtual

Jul 2021 — **Session Chair: Lightening Talks on Hardware** — **ICONS 2021 Conference**
- *Conference*: International Conference on Neuromorphic Systems (ICONS) 2021
- *Venue*: Virtual

Oct 2020 — **Workshop Chair** — **IEEE AQAI 2020 Workshop**
- *Workshop*: Applied Quantum Artificial Intelligence (AQAI) Workshop, held as part of the IEEE Quantum Week: IEEE International Conference on Quantum Computing and Engineering (QCE) 2020
- *Venue*: Denver, Colorado / Virtual

Sep 2020 — **Breakout Session Facilitator** — **NITRD Extreme Heterogeneity Software**
- *Workshop*: Software in the Era of Extreme Heterogeneity
- *Venue*: Virtual

Jul 2020 — **Organizing Committee Member** — **ICONS 2020 Conference**
- *Conference*: International Conference on Neuromorphic Systems (ICONS) 2020
- *Venue*: Chicago, Illinois / Virtual

Jul 2020 — **Conference Session Chair** — **ICONS 2020 Conference**
- *Conference*: International Conference on Neuromorphic Systems (ICONS) 2020
- *Session*: Poster Session
- *Venue*: Chicago, Illinois / Virtual

Mar 2020 — **Workshop Track Co-Chair** — **DOE 5GEEIW Workshop**
- *Workshop*: U.S. Department of Energy 5G Enabled Energy Innovation Workshop (5GEEIW)
- *Track*: Software Architectures
- *Venue*: Chicago, Illinois

Nov 2018 — **Conference Session Chair** — **IEEE SSCI 2018 Conference**
- *Conference*: IEEE Symposium Series on Computational Intelligence (SSCI) 2018
- *Session*: Symposium on Neuromorphic Cognitive Computing
- *Venue*: Bangalore, India

Aug 2018– Jul 2019 — **Graduate Curriculum Committee (GCC) Member** — **RPI CS Department**
- Elected into GCC by about 100 graduate students in the Computer Science (CS) department at Rensselaer Polytechnic Institute (RPI).
- Improved curriculum, degree requirements and policies for masters and doctoral programs in Computer Science.
- Assisted graduate students with curriculum-related and degree requirements issues.

Neuromorphic Computing

Neuromorphic Algorithms

Neuromorphic Computability and Complexity

General Purpose Neuromorphic Computing

Publications

Journal Publications

1. **Date, Prasanna**, Thomas Potok. "Adiabatic Quantum Linear Regression." *arXiv preprint arXiv:2008.02355* (2020). Accepted at *Nature Scientific Reports* journal.
2. **Date, Prasanna**, Catherine Schuman, Bill Kay, and Thomas Potok. "Neuromorphic Computing is Turing-Complete." *arXiv preprint arXiv:2104.13983* (2021).
3. Arthur, Davis, and **Prasanna Date**. "Balanced k-means clustering on an adiabatic quantum computer." Quantum Information Processing 20, no. 9 (2021): 1-30."
4. **Date, Prasanna**, Davis Arthur, and Lauren Pusey-Nazzaro. "QUBO formulations for training machine learning models." *Scientific Reports* 11, no. 1 (2021): 1-10.
5. **Date, Prasanna**, Robert Patton, Catherine Schuman, and Thomas Potok. "Efficiently embedding QUBO problems on adiabatic quantum computers." *Quantum Information Processing* 18, no. 4 (2019): 117.
6. Digalwar, Abhijeet K., and **Prasanna A. Date**. "Development of fuzzy PROMETHEE algorithm for the evaluation of Indian world-class manufacturing organisations." *International Journal of Services and Operations Management* 24, no. 3 (2016): 308-330.

Conference Publications

1. **Date, Prasanna**, Bill Kay, Catherine Schuman, Robert Patton, and Thomas Potok. "Computational Complexity of Neuromorphic Algorithms." Accepted at *International Conference on Neuromorphic Systems (ICONS) 2021*.
2. Kay, Bill, Catherine Schuman, Jade O'Connor, **Prasanna Date**, and Thomas Potok. "Neuromorphic Graph Algorithms: Cycle Detection, Odd Cycle Detection, and Max Flow" Accepted at *International Conference on Neuromorphic Systems (ICONS) 2021*.
3. Patton, Robert, Catherine Schuman, Shruti Kulkarni, Maryam Parsa, Parker Mitchell, Quentin Haas, Christopher Stahl, Spencer Paulissen, **Prasanna Date**, Thomas Potok, and Shay Snyder. "Neuromorphic Computing for Autonomous Racing." Accepted at *International Conference on Neuromorphic Systems (ICONS) 2021*.
4. **Date, Prasanna**, Christopher D. Carothers, John E. Mitchell, James A. Hendler, and Malik Magdon-Ismail. "Training Deep Neural Networks with Constrained Learning Parameters." In IEEE International Conference on Rebooting Computing (ICRC) 2020.
5. Hamilton, Kathleen, Tiffany Mintz, **Prasanna Date**, and Catherine D. Schuman. "Spike-based graph centrality measures." In International Conference on Neuromorphic Systems 2020, pp. 1-8. 2020.
6. Hamilton, Kathleen, **Prasanna Date**, Bill Kay, and Catherine Schuman D. "Modeling epidemic spread with spike-based models." In International Conference on Neuromorphic Systems 2020, pp. 1-5. 2020.
7. Schuman, Catherine D., J. Parker Mitchell, J. Travis Johnston, Maryam Parsa, Bill Kay, **Prasanna Date**, and Robert M. Patton. "Resilience and Robustness of Spiking Neural Networks for Neuromorphic Systems."
8. Parsa, Maryam, Catherine D. Schuman, **Prasanna Date**, Derek C. Rose, Bill Kay, J. Parker Mitchell, Steven R. Young, Ryan Dellana, William Severa, Thomas E. Potok, and Kaushik Roy. "Hyperparameter Optimization in Binary Communication Networks for Neuromorphic Deployment." *arXiv preprint arXiv:2005.04171* (2020).
9. **Date, Prasanna**, Catherine Schuman, Robert Patton, and Thomas Potok. "A classical-quantum hybrid approach for unsupervised probabilistic machine learning." In *Future of Information and Communication Conference*, pp. 98-117. Springer, Cham, 2019.
10. **Date, Prasanna**, Christopher D. Carothers, James A. Hendler, and Malik Magdon-Ismail. "Efficient classification of supercomputer failures using neuromorphic computing." In *2018 IEEE Symposium Series on Computational Intelligence (SSCI)*, pp. 242-249. IEEE, 2018.
11. **Date, Prasanna**, James A. Hendler, and Christopher D. Carothers. "Design index for deep neural networks." *Procedia Computer Science* 88 (2016): 131-138.

Workshop Publications

1. Schuman, Catherine D., Bill Kay, **Prasanna Date**, Ramakrishnan Kannan, Piyush Sao, and Thomas E. Potok. "Sparse Binary Matrix-Vector Multiplication on Neuromorphic Computers." In *2021 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pp. 308-311. IEEE, 2021.
2. Kay, Bill, **Prasanna Date**, and Catherine Schuman. "Neuromorphic Graph Algorithms: Extracting Longest Shortest Paths and Minimum Spanning Trees." In Proceedings of the *Neuro-inspired Computational Elements Workshop*, pp. 1-6. 2020.

Other

1. **Date, Prasanna**. "Quantum Discriminator for Binary Classification." arXiv preprint arXiv:2009.01235 (2020).
2. Pusey-Nazzaro, Lauren and **Prasanna Date**. "Adiabatic Quantum Optimization Fails to Solve the Knapsack Problem." *arXiv preprint arXiv:2008.07456* (2020).
3. **Date, Prasanna**. "Combinatorial Neural Network Training Algorithm for Neuromorphic Computing." PhD diss., Rensselaer Polytechnic Institute, 2019.

Invited Talks & Presentations

Invited Talks

1. **Invited Talk**: "Quantum Machine Learning Techniques" at University of Washington at Seattle, as part of the Computational Research Leadership Council (CRLC) Seminar Series, hosted by the Sustainable Horizons Institute (SHI), a non-profit organization dedicated to building sustainable and inclusive scientific communities. October 2021, virtual.
2. **Invited Talk**: "Advancing Science using Quantum Machine Learning" at ORNL Computing and Computational Sciences Directorate (CCSD) Science Research Seminar. Hosted by Dr. Barney Maccabe, Division Director at ORNL. July 2021, virtual.
3. **Guest Lecture**: "Introduction to Quantum Computing" at RPI Summer School on Advanced Cyberinfrastructure Training for Modeling Physical Systems. Joel Giedt, Professor at RPI. July 2021, virtual.
4. **Guest Lecture**: "Introduction to Neuromorphic Computing" at RPI Summer School on Advanced Cyberinfrastructure Training for Modeling Physical Systems. Joel Giedt, Professor at RPI. July 2021, virtual.
5. **Guest Lecture**: "Quantum Artificial Intelligence" at RPI Summer School on Advanced Cyberinfrastructure Training for Modeling Physical Systems. Hosted by Prof. Joel Giedt, Professor at RPI. July 2020, virtual.
6. **Invited Talk**: "Adiabatic Quantum Linear Regression" at ORNL's Quantum Machine Learning (QML) Club. Hosted by Dr. Ryan Bennink. July 2019, virtual.
7. **Invited Talk**: "A Classical-Quantum Hybrid Approach for Unsupervised Probabilistic Machine Learning" at 120th Topical Symposium of the APS New York State Section: Physics of Artificial Intelligence. Hosted by Dr. Abram Falk, Research Staff Member at IBM. April 2019, Yorktown Heights, New York.
8. **Invited Talk**: "A Classical-Quantum Hybrid Approach for Unsupervised Probabilistic Machine Learning" at RPI Physics Department Seminar. Hosted by Prof. Joel Giedt. Spring 2019, Troy, New York.
9. **Invited Talk**: "Solving NP-Hard Problems using Quantum Computers" at group meeting of Computational Data Analytics Group at ORNL. Hosted by Dr. Thomas Potok. June 2018, Oak Ridge, Tennessee.

Presentations

1. **Conference Presentation**: "Computational Complexity of Neuromorphic Algorithms" at International Conference on Neuromorphic Systems (ICONS) 2021. July 2021, virtual.
2. **Conference Presentation**: "Training Deep Neural Networks with Constrained Learning Parameters" at IEEE International Conference on Rebooting Computing (ICRC) 2020. October 2020, virtual.
3. **Workshop Presentation**: "Quantum Encrypted Communication over 5G Networks for Autonomous Vehicles" at U.S. Department of Energy (DOE) 5G Enabled Energy Innovation Workshop (5GEEIW). March 2020, Chicago, Illinois.
4. **Conference Presentation**: "A Classical-Quantum Hybrid Approach for Unsupervised Probabilistic Machine Learning" at Future of Information and Communication Conference 2019. March 2019, San Francisco, California.
5. **Conference Presentation**: "Efficient Classification of Supercomputer Failures using Neuromorphic Computing" at IEEE Symposium Series on Computational Intelligence (SSCI) 2018. November 2018. Bangalore, India.
6. **Conference Presentation**: "Efficiently Embedding QUBO Problems on Adiabatic Quantum Computers" at D-Wave Qubits North America Quantum Computing Users Conference. September 2018, Knoxville, Tennessee.
7. **Conference Presentation**: "Design Index for Deep Neural Networks" at Biologically Inspired Cognitive Architectures (BICA) 2016. July 2016, New York City, New York.

Posters

1. "A Classical-Quantum Hybrid Approach for Unsupervised Probabilistic Machine Learning" at D-Wave Qubits North America Quantum Computing Users Conference. September 2018, Knoxville, Tennessee.
2. "Efficient Classification of Supercomputer Failures" at International Conference on Neuromorphic Systems (ICONS) 2018. July 2018, Knoxville, Tennessee.

Editorship & Peer Review

Editorship

1. *Associate Editor*: **Transactions on Neural Networks and Learning Systems** | Impact Factor: 8.8
2. *Review Editor*: **Frontiers in Systems Neuroscience** | Impact Factor: 3.3

Peer Reviewed Journals

1. *Reviewer*: **IEEE Transactions on Neural Networks and Learning Systems (TNNLS)** | Impact Factor: 8.8
2. *Reviewer*: **Nature Communications Physics** | Impact Factor: 8.1
3. *Reviewer*: **Nature Scientific Reports** | Impact Factor: 4.4
4. *Reviewer*: **IEEE Transactions on Computers** | Impact Factor: 3.1
5. *Reviewer*: **Public Library of Science (PLOS) One** | Impact Factor: 2.7
6. *Reviewer*: **Springer Quantum Information Processing (QIP)** | Impact Factor: 2.4
7. *Reviewer*: **World Scientific International Journal of Quantum Information (IJQI)** | Impact Factor: 1.2

Conferences

1. *Program Committee Member*: **International Conference on Neuromorphic Systems (ICONS) 2021**
2. *Program Committee Member*: **International Conference on Neuromorphic Systems (ICONS) 2020**
3. *Program Committee Member*: **International Conference on Neuromorphic Systems (ICONS) 2018**
4. *Reviewer*: **IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS) 2021**

Workshops

1. *Program Committee Chair*: **IEEE Applied Quantum Artificial Intelligence (AQAI) Workshop 2020**

Teaching Experience

Jul 2021 — **Guest Lecturer** — **Rensselaer Polytechnic Institute, Troy, NY**
- *Topic*: Introduction to Quantum Computing
- *Platform*: Summer School on 'Advanced Cyberinfrastructure Training for Modeling Physical Systems 2021'
- *Host*: Prof. Joel Giedt

Jul 2021 — **Guest Lecturer** — **Rensselaer Polytechnic Institute, Troy, NY**
- *Topic*: Introduction to Neuromorphic Computing
- *Platform*: Summer School on 'Advanced Cyberinfrastructure Training for Modeling Physical Systems 2021'
- *Host*: Prof. Joel Giedt

Jun 2020 — **Guest Lecturer** — **Rensselaer Polytechnic Institute, Troy, NY**
- *Topic*: Quantum Artificial Intelligence
- *Platform*: Summer School on 'Advanced Cyberinfrastructure Training for Modeling Physical Systems 2020'
- *Host*: Prof. Joel Giedt

Jan 2019–May 2019, Aug 2014–May 2015 — **Teaching Assistant** — **Rensselaer Polytechnic Institute, Troy, NY**
- *Courses*: Parallel Computing, Big Data Analytics, Optimization Algorithms and Applications, Decision Focussed Systems Engineering
- *Duties*: Graded assignments, conducted office hours, mentored graduate and undergraduate students

Quantum Artificial Intelligence

Quantum Machine Learning

Quantum Neural Networks

Quantum Support Vector Machine

Quantum Regression

Mentoring Experience

Jun 2020–Aug 2020 **Tech Talk Coach** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Students*: Joseph Schmidt, University of Texas at Austin; Clarice Phelps, University of Tennessee at Knoxville; Edward Ruiz, Columbia University; Amy Moreno, New York University
- *Task*: Coached four GEM students in preparing their research talks for a 5-minute Tech Talk competition held at ORNL.
- *Program*: The National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM) Fellowship

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Wyatt Smith
- *Project*: Supervised Learning using the Quantum Discriminator
- *Program*: Pathways to Computing Internship Program (PCIP) at ORNL

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Davis Arthur
- *Project*: Empirical Evaluation of Quantum Neural Networks (QNN)
- *Program*: Virtual Undergraduate Research Summer Internship (vURSI) at ORNL

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Devon Delgado
- *Project*: Empirical Evaluation of Adiabatic Quantum Support Vector Machines (QSVM)
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Lucas Moynihan
- *Project*: Review of Support Vector Machines (SVM) on Universal Quantum Computers
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: David Quiroga, Universidad de Antioquia, Columbia
- *Project*: Clustering quantum states for efficient quantum signal propagation
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Benjamin Hansen, Brigham Young University, Idaho
- *Project*: Financial portfolio optimization using quantum computing
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Davis Arthur, Auburn University, Alabama
- *Project*: Balanced k-Means Clustering on an Adiabatic Quantum Computer
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Jun 2020–Aug 2020 **Research Mentor** **Oak Ridge National Laboratory, Oak Ridge, TN**

- *Student*: Lauren Pusey-Nazzaro, Washington University in St. Louis, Missouri
- *Project*: Adiabatic Quantum Optimization Fails to Solve the Knapsack Problem
- *Program*: U.S. Department of Energy Science Undergraduate Laboratory Internship (SULI)

Volunteering Experience

July 2021 – September 2021
IEEE Computer Society EITBoK Reviewer — **IEEE**
- Reviewed the IEEE Computer Society's Enterprise Information Technology Body of Knowledge (EITBoK), which defines the key knowledge areas for the IT profession and embodies concepts that are recognized as good practice in the IT domain and that are applicable to most IT efforts
- *Organizer*: IEEE Computer Society EITBoK

June 2021 – Present
IEEE.tv Ambassador — **IEEE**
- Promoted, publicized and contributed to the IEEE.tv internet television network
- *Organizer*: IEEE.tv, which is an award winning internet television network by IEEE

June 2021 – Present
IEEE Puzzlers Volunteer — **IEEE**
- Designed math, logic and verbal puzzles for the IEEE Puzzlers Program
- *Organizer*: IEEE Puzzlers Program

March 2021
Back-Up Moderator — **Tennessee Science Bowl (TSB)**
- Served as the Back-Up Moderator in the 2021 edition of the Tennessee Science Bowl (TSB).
- *Organizer*: Oak Ridge Institute for Science and Education (ORISE)

Oct 2020–Dec 2020
Co-Leader, Movie/TV/Streaming Community Group — **Oak Ridge National Laboratory, Oak Ridge, TN**
- Virtually led the Movie/TV/Streaming Community Group, comprising of 20 people at ORNL during COVID-19.
- Conducted discussion sessions about movies, TV and streaming, organized weekly meetings, supervised fun activities such as movie-related quizzes.

Extra-Curricular

Oct 2018
Brown University Ballroom Competition — **Providence, RI**
- *Award*: **Second Place** in Ballroom Dancing Team Event
- *Organizer*: Brown University

Oct 2018
Princeton Ballroom Competition — **Princeton, NJ**
- *Award*: **Third Place** in Latin Rumba
- *Organizer*: Princeton University

Oct 2018
Princeton Ballroom Competition — **Princeton, NJ**
- *Award*: **Fourth Place** in Rhythm Rumba
- *Organizer*: Princeton University

Oct 2018
Princeton Ballroom Competition — **Princeton, NJ**
- *Award*: **Fifth Place** in Latin Jive
- *Organizer*: Princeton University

Oct 2018
Princeton Ballroom Competition — **Princeton, NJ**
- *Award*: **Seventh Place** in Rhythm Chacha
- *Organizer*: Princeton University

June 2017
Cricket All-Stars Mayor's Cup — **Albany, NY**
- *Award*: **Winner** of 2017 CDCA All-Stars Mayor's Cup
- *Organizer*: Capital District Cricket Association (CDCA)

Sep 2015
137th New York State Chess Championship — **Albany, NY**
- *Award*: **Top Scoring Unrated Player** (Under 1200 Section)
- *Organizer*: United States Chess Federation (USCF)

Miscellaneous Experience

May 2017–Dec 2017
President, Cricket Club — **Rensselaer Polytechnic Institute, Troy, NY**
- Led the Cricket Club, comprising of 50 people at Rensselaer Polytechnic Institute.
- Scheduled practices, managed budget, procured equipment, organized club outing events and represented the club in RPI student union.

Jun 2013–Aug 2013
Summer Intern — **Larsen & Toubro Limited, Mumbai, India**
- Designed an automation system comprising of a robotic arm for TIG welding.
- Resulted in 15% improvement in productivity. Received a job offer based on that.

Aug 2012–Dec 2012
President, Department of Music — **BITS Pilani, India**
- Led the department of 50 people in conducting music workshops, organizing music performances and participating in music competitions.
- Generated revenue, managed finances, procured equipment and organized music events.

Jun 2012–Aug 2012
Summer Intern — **Thermax Limited, Pune, India**
- Created Standard Operating Procedures (SOP) for drum shop and panel shop, which were used in manufacturing bi-drum boilers.