Rongbing Xu

PhD Student · University of Waterloo

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Education

University of Waterloo *Waterloo, ON, Canada*

Ph.D. in Systems Design Engineering (Aeronautics) *2024-Present*

- Advisors: Dr. Shi Cao, Dr. Michael Barnett-Cowan

University of Waterloo *Waterloo, ON, Canada*

M.A.Sc. in Systems Design Engineering *2019-2022*

- Advisor: Dr. Shi Cao
- Thesis: Modeling Pilot Flight Performance on Pre-Flight and Take-Off Tasks with A Cognitive Architecture.

University of New Mexico *Albuquerque, NM, USA*

B.Sc. in Computer Science *2016-2019*

- Minors in Mathematics

Professional Experience

2024-present	**Graduate Teaching Assistant**, University of Waterloo
2022-2024	**Research Assistant**, University of Waterloo
2019-2022	**Graduate Teaching Assistant**, University of Waterloo

Publications

Published

Rongbing Xu, Shi Cao, Suzanne K. Kearns, Ewa Niechwiej-Szwedo, and Elizabeth Irving. 2024. Computational cognitive modeling of pilot performance in pre-flight and take-off procedures. *Journal of Aviation/Aerospace Education & Research*, 33(4), 2.

Rongbing Xu, Shi Cao. 2021. Modeling pilot flight performance in a cognitive architecture: model demonstration. *In Proceedings of the Human Factors and Ergonomics Society Annual Meeting*. Vol. 65. No. 1.

Accepted

Rongbing Xu, Shi Cao, Elizabeth Irving, Suzanne K. Kearns, and Ewa Niechwiej-Szwedo. 2025. Bridging cognitive modeling and pilot training: A QN-ACTR model for complex flight tasks. *In Proceedings of the 2025 International Symposium on Aviation Psychology*. Oregon State University.

Submitted/Under Review

Rongbing Xu, Shi Cao, Chenyang Zhang, Michael Barnett-Cowan, Elizabeth Irving, Suzanne K. Kearns, and Ewa Niechwiej-Szwedo. 2025. Modelling Pilot Stress During In-aircraft Tasks Using a Consumer-Grade EEG Device and Machine Learning. *International Journal of Industrial Ergonomics*.

Other

Rongbing Xu, Shi Cao, Michael Barnett-Cowan, Gulnaz Bulbul, Elizabeth Irving, Suzanne K. Kearns, and Ewa Niechwiej-Szwedo. 2025. A Comprehensive Data Collection and Processing Protocol for General Aviation Pilot Performance Assessment and Behaviour Research. *WISA Technical Report (2025-001)*. Waterloo Institute for Sustainable Aeronautics, University of Waterloo.

Rongbing Xu. 2022. Modeling Pilot Flight Performance on Pre-Flight and Take-Off Tasks with A Cognitive Architecture. *UWSpace*.

Awards, Fellowships, & Grants

2016-2019 **International Amigo Scholarship**, University of New Mexico
2019-2022 **Graduate Research Studentship**, University of Waterloo
2024-present **Graduate Research Studentship**, University of Waterloo

Presentations

Peer-reviewed

Rongbing Xu, Shi Cao, Elizabeth Irving, Suzanne K. Kearns, and Ewa Niechwiej-Szwedo. 2025. Bridging Cognitive Modeling and Pilot Training: A QN-ACTR Model for Complex Flight Tasks. Poster presentation: *2025 International Symposium on Aviation Psychology. Oregon State University*.

Rongbing Xu, Shi Cao, Chenyang Zhang, Michael Barnett-Cowan, Elizabeth Irving, Suzanne Kearns, and Ewa Niechwiej-Szwedo. 2025. In-Aircraft Stress Detection Using Consumer EEG Device and Machine Learning with Optimized Feature Selection. Poster presentation: *Southern Ontario Neuroscience Association 2025*.

Rongbing Xu and Shi Cao. 2021. Modeling Pilot Flight Performance in a Cognitive Architecture: Model Demonstration. Oral presentation: *Human Factors and Ergonomics Society 65th Annual Meeting*.

Other

Rongbing Xu, Shi Cao, Suzanne Kearns, Ewa Niechwiej-Szwedo, Elizabeth Irving. 2024. A Cognitive Modelling Approach to Pilot Performance Simulation. Poster: *Sustainable Aeronautics Summit 2024*.

Rongbing Xu. 2024. Enhancing Pilot Training with Cognitive Modeling and Machine Learning. Oral presentation: *Human Factors and Ergonomics Inter-University Workshop 2024*.

Rongbing Xu, Shi Cao, Ewa Niechwiej-Szwedo, Elizabeth Irving, and John Munoz. 2023. Data Platform and Information Technologies Transforming General Aviation Pilot Training. Poster: *Sustainable Aeronautics Summit 2023*.

Rongbing Xu. 2022. Modeling Pilot Flight Performance on Take-off Task with QN-ACTR. Oral presentation: *Virtual MathPsych/ICCM 2022*.

Teaching Experience

Spring 2025 **Data Structures and Algorithms**, Teaching Assistant, University of Waterloo
Winter 2025 **Data Structures and Algorithms**, Teaching Assistant, University of Waterloo
Fall 2024 **Cognitive Ergonomics**, Teaching Assistant, University of Waterloo
Winter 2021 **Data Structures and Algorithms**, Teaching Assistant, University of Waterloo
Fall 2021 **Elementary Engineering Mathematics**, Teaching Assistant, University of Waterloo
Spring 2021 **Data Structures and Algorithms**, Teaching Assistant, University of Waterloo
Winter 2021 **Optimization and Numerical Methods**, Teaching Assistant, University of Waterloo
Fall 2020 **Data Structures and Algorithms**, Teaching Assistant, University of Waterloo

Research Experience

University of Waterloo - Department of System Design Engineering *Waterloo, ON, Canada*
Advisor: Dr. Shi Cao *2025 - Present*
- Flight and Pilot Data Collection in A Simulator to Support Objective Assessment in Pilot Training

University of Waterloo - Department of System Design Engineering *Waterloo, ON, Canada*
Advisor: Dr. Shi Cao *2024 - Present*
- Enhancing Pilot Training and Performance Evaluation: A Data-Driven Approach through Computational Cognitive Model and Machine Learning

Waterloo Institute of Sustainable Aeronautics *Waterloo, ON, Canada*
Advisor: Dr. Shi Cao *2022 - 2024*
- Data Platform and Information Technologies Transforming General Aviation Pilot Training

Mitacs *Waterloo, ON, Canada*
Advisor: Dr. Shi Cao *2021*
- Operator Space Situation Awareness in Space Object Tracking Tasks

University of Waterloo - Department of System Design Engineering *Waterloo, ON, Canada*
Advisor: Dr. Shi Cao *2019-2022*
- Modeling Pilot Flight Performance on Pre-flight and Take-off Tasks with A Cognitive Architecture

Outreach & Professional Development

Peer Review

Reviewer of *IEEE Transactions on Human-Machine Systems*
Reviewer of *Human Factors and Ergonomics Society 65th International Annual Meeting*

Professional Affiliations

Director of Communications of *University of Waterloo - Human Factors and Ergonomics Society* (2025)
Student Affiliate of *Human Factors and Ergonomics Society*
Graduate Student Member of *Institute of Electrical and Electronics Engineers*