

# WAYNE C. W. GIANG

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## EDUCATION

*Ph.D. Candidate*, Industrial Engineering

University of Toronto, 2018

Prospective Professors in Training Certificate (2015)

Dissertation: *Supporting Medical Dispatchers' Understanding of Uncertainty in Short-term Dispatch Decisions*

Advisors: Birsen Donmez, Russell D. MacDonald | Committee: Greg A. Jamieson, Mark Chignell

*Masters of Applied Science*, Systems Design Engineering

University of Waterloo, 2012

Thesis: *Application of Crossmodal Relationships in Interfaces for Complex Systems: A Study of Temporal Synchrony*

Advisor: Catherine M. Burns

*Bachelors of Applied Science with Honours Distinction*, Systems Design Engineering, Cognitive Science Option

University of Waterloo, 2009

Thesis: *Interfaces for Facilitating Information Transfer between Shared Digital Tabletop Displays and Individual Tablet Displays for a Naval Planning Scenario*

Advisor: Stacey D. Scott

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## AWARDS

NSERC Canada – Postgraduate Scholarship (2012-2015)

NSERC Canada – Alexander Graham Bell Canada Graduate Scholarship (2010-2011)

Ontario Graduate Scholarship (2015-2016)

University of Toronto School of Graduate Studies Conference Grant (2015)

Mechanical and Industrial Engineering – University of Toronto Travel Grant (2014)

University of Waterloo President's Graduate Scholarship (2010-2011)

Vale Inco Ltd. Workterm Report Award (2008)

Faculty of Engineering Entrance Scholarship (2004)

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## RELATED EXPERIENCE

*Graduate Research Assistant*, 2012 – Present

Prof. Birsen Donmez, Human Factors and Applied Statistics Lab

University of Toronto

### *Project 1: Short-Term Planning Decision Support for Interfacility Medical Transportation*

- Investigating how visualizations of historical data can help decision makers cope with uncertainty in naturalistic decision-making contexts
- Working in collaboration with Ornge, Ontario's air ambulance service, to design decision support tools that provide patient transfer time estimates to support short-term medical dispatch decision making
- Key methods used: Onsite observations and interviews with dispatchers; experimental studies (in lab and online); statistical analysis

### *Project 2: Effects of Wearable Technology on Distracted Driving Behaviour*

- Examining the effects of smartwatches on distracted driving, focusing on the individual factors that drive engagement behaviour
- Key methods used: Simulator experiments; eye-tracking and driving performance analysis

*Graduate Research Assistant, 2009 – 2011*

Prof. Catherine M. Burns, Advanced Interface Design Lab

University of Waterloo

- Designed and evaluated multimodal interfaces for future Uninhibited Aerial Vehicle (UAV) Ground Control Stations that support UAV operators during the auto-land recovery portion of flight

*Undergraduate Research Assistant, 2007 – 2008*

Dr. Jocelyn Keillor, Advance Interface Group

Defence Research and Development Canada

- Examined the effect of visual cueing in assisted target detection systems for Airborne Search and Rescue using visual search experiments

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## PUBLICATIONS AND PRESENTATIONS

### Journal Articles

1. **Giang, W.C.W.**, Chen, H-Y.W., Donmez, B. (2017). Smartwatches vs. Smartphones: Notification Engagement while Driving. *International Journal of Mobile Human-Computer Interaction*. 9(2). 39-57.
2. **Giang, W.C.W.**, Donmez, B., Ahghari, M., MacDonald, R.D. (2014). Impact of Precipitation on Interfacility Land Critical Care Travel Times. *Prehospital and Disaster Medicine*. 29(6). 1-7.
3. **Giang, W.C.W.**, Donmez, B., Fatahi, A., Ahghari, M., MacDonald, R.D. (2014). Supporting Air versus Ground Vehicle Decisions for Interfacility Medical Transports Using Historical Data. *IEEE Transactions on Human-Machine Systems*, 44(1), 55-65.

### Manuscripts under Review

1. Arrabito, G.R., Ho, G., Li, Y., **Giang, W.C.W.**, Burns, C.M., Hou, M. (submitted – June 2018). Multisensory Cues for Encoding Urgency of System Hazards: Effect of Operator Experience on Perceived Urgency. *International Journal of Aerospace Psychology*.

### Manuscripts in Preparation

1. **Giang, W.C.W.**, Donmez, B. (expected submission – July 2018). How do individuals estimate variable values using visualizations of historical data?
2. **Giang, W.C.W.**, Donmez, B. (expected submission – Sept. 2018). How does contextual information affect the estimation of future variables?
3. **Giang, W.C.W.**, Donmez, B., Ahghari, M., MacDonald, R.D. (in preparation). Short-Term Decision Making in a Large-Scale Air Medical Transport System. *Pre-Hospital Emergency Care*.

### Conference Proceeding Papers (Presenter Underlined)

#### *Fully Reviewed*

1. **Giang, W.C.W.**, Hui, L., Donmez, B., Ahghari, M., & MacDonald, R.D. (2016). Dispatch Decision Making in an Air Medical Transport System. (Presentation) In Proceedings of the 60th Annual Meeting of the Human Factors and Ergonomics Society, Washington D.C., Sept. 19-23, 2016.
2. **Giang, W.C.W.**, Shanti, I., **Chen, H-Y.W.**, Zhou, A., Donmez, B. (2015). Smartwatches vs. Smartphones: A Preliminary Report of Driver Behavior and Perceived Risk while Responding to Notifications. (Presentation) In Proceedings of the 7th Annual Conference on Automotive User Interfaces and Interactive Vehicular Applications, Nottingham, U.K. Sept. 1-3, 2015.
3. **Giang, W.C.W.**, Donmez, B. (2015). Interpreting Visualizations of Historical Variability for Estimating Future Events. (Poster) In Proceedings of International Conference on Naturalistic Decision Making 2015, McLean, VA, June 9-12, 2015.

4. **Giang, W.C.W.**, Hoekstra-Atwood, L., Donmez, B. (2014). Driver Engagement in Notifications: A Comparison of Visual-Manual Interaction between Smartwatches and Smartphones. (Presentation) In Proceedings of the 58th Annual Meeting of the Human Factors and Ergonomics Society, Chicago, Oct. 27-31, 2014.
5. **Hoekstra-Atwood, L.**, Chen, H-Y.W., **Giang, W.C.W.**, Donmez, B. (2014). Measuring Inhibitory Control in Driver Distraction. (Presentation) In Proceedings of the 6th Annual Conference on Automotive User Interfaces and Interactive Vehicular Applications, Seattle, WA, Sept. 17-19, 2014.
6. Saffarian, M., **Giang, W.** (2013). Improving Perceived Fairness of Task Assignments in Cardiovascular Intensive Nursing Care Unit with Simple Queuing Mechanism. (Presentation) In Proceedings of the 57th Annual Meeting of the Human Factors and Ergonomics Society, San Diego, Sept. 30-Oct. 4, 2013.
7. Arrabito, G.R., **Ho, G.**, Li, Y., **Giang, W.**, Burns, C.M., Hou, M., Pace, P. (2013). Multimodal Displays for Enhancing Performance in a Supervisory Monitoring Task: Reaction Time to Detect Critical Events. (Presentation) In Proceedings of the 57th Annual Meeting of the Human Factors and Ergonomics Society, San Diego, Sept. 30-Oct. 4, 2013.
8. **Giang, W.**, Burns, C.M. (2012). Sonification Discriminability and Perceived Urgency. (Presentation) In Proceedings of the 56th Annual Meeting of the Human Factors and Ergonomics Society, Boston, Oct. 22-26, 2012.
9. **Giang, W.**, Masnavi, E., Burns, C.M. (2011). Perceptions of Temporal Synchrony in Multimodal Displays. (Presentation) In Proceedings of the 55th Annual Meeting of the Human Factors and Ergonomics Society, Las Vegas, Sept. 19-23, 2011.
10. **Giang, W.**, Keefe, A. Keillor, J. (2010). Effects of Brightness of Assisted Target Detection Cues in a Simulated Search and Rescue Task. (Presentation) In Proceedings of the 54th Annual Meeting of the Human Factors and Ergonomics Society, San Francisco, Sept. 27-Oct. 1, 2010.
11. **Giang, W.**, Keillor, J. (2009). Effects of Cue Saliency in an Assisted Target Detection System for Search and Rescue. (Presentation) In Proceedings of the 2009 IEEE Toronto International Conference – Science and Technology for Humanity, Toronto, Canada, Sept. 26-27, 2009.

*Abstract Reviewed*

1. **Giang, W.C.W.**, Ponnambalam, C.T., He, X., Donmez, B. (2018). Understanding individual differences in use of historical-data-based decision support tools for time estimation in medical dispatch. (Poster) Human Factors and Ergonomics in Healthcare 2018, Boston, MA, March 26-28, 2018
2. **Giang, W.C.W.**, Donmez, B., Zakir, A., Ahghari, M., MacDonald, R.D. (2015). Supporting Dispatch Decisions in Interfacility Medical Transfers: Understanding the Roles of Uncertainty and Reliability. (Poster) Human Factors and Ergonomics in Healthcare 2015, Baltimore, MD, April 26-29, 2015.
3. **Momtahan, K.**, Burns, C.M., Sherrard, H., Labinaz, M., Mesana, T., Caves, W., Enomoto, Y., **Giang, W.**, Ho, V., Pajek, D., Saunders, C (2006). Personal Digital Assistants and Decision Support Software: New Mechanisms to Improve Access to Cardiac Care Best Practices. (Poster) e-HEALTH 2006, Victoria, Canada, May 1-4, 2006.

**Technical Reports**

1. Chen, H-Y.W., Marulanda, S., Hoekstra-Atwood, L., Donmez, B., **Giang, W.C.W.** (2014). Designing feedback to Induce Safer Driving Behaviors: A Laboratory Study of Driver Characteristics and Susceptibility to Driver Distractions. Technical report submitted to Toyota Collaborative Safety Research Center.
2. **Giang, W.**, Li, Y., Burns, C., Arrabito, G.R. (2013). Baseline and Multimodal UAV GCS Interface Design: Progress Report May, 2011-December, 2011. (DRDC-RDDC-2014-C129). Toronto, Ontario: Defence Research and Development Canada. July, 2013.
3. **Giang, W.**, Masnavi, E., Rizvi, S., Morita, P., Burns, C., Arrabito, G.R. (2011). Baseline and Multimodal UAV GCS Interface Design. (DRDC-RDDC-2014-C128). Toronto, Ontario: Defence Research and Development Canada. December, 2011.
4. **Giang, W.**, Santhakumaran, S., Masnavi, E. Glussich, D., Kline, J., Chui, F., Burns, C., Histon, J., Zelek, J. (2010). Multimodal Interfaces: Literature Review of Ecological Interface Design, Multimodal Perception and

Attention, and Intelligent Adaptive Multimodal Interfaces. (DRDC-Toronto-CR-2010-051). Toronto, Ontario: Defence Research and Development Canada. May, 2010.

## Theses

1. **Giang, W.C.W.** (2012). Applications of Crossmodal Relationships in Interfaces for Complex Systems: A Study of Temporal Synchrony. (Master's Thesis) University of Waterloo.
2. Rampal, A., Liang, S., **Giang, W.** (2009). Concurrent Individual and Group Information Control System. (Undergraduate Thesis) Systems Design Engineering Annual, pp. 19-20. University of Waterloo.

## Invited Conference Presentations (Abstract Reviewed, Presenter Underlined)

1. **Giang, W.C.W.**, Donmez, B., Ahghari, M., MacDonald, R.D. (2013). Making Medical Transfer Mode Decisions under Time Pressure: Understanding how Decision Makers Interpret Historical Data. (Presentation) 2013 Joint Statistical Meetings, Montreal, Aug. 3-8, 2013.

## Other Presentations (Abstract Reviewed, Presenter Underlined)

1. He., X., **Giang, W.C.W.**, Donmez, B. (2016). Understanding the Influence of User's Personality When Using Various Visualizations to Make Estimations Based on Historical Data. (Presentation) Undergraduate Engineering Research Day – 2017 Conference, University of Toronto, Toronto, Ontario, Aug. 2017.
2. Medinac, A., **Giang, W.C.W.**, Donmez, B. (2016). Decision Making in Medical Transport Dispatch: Investigating the Effects of Team Member Locations. (Presentation) Undergraduate Engineering Research Day – 2016 Conference, University of Toronto, Toronto, Ontario, Aug. 2016.
3. Zhang, S., **Giang, W.C.W.**, Donmez, B. (2016). Classification of Drivers' Visual-Manual Behaviours while Engaging with Smartphone and Smartwatch Notifications. (Poster) Undergraduate Engineering Research Day – 2016 Conference, University of Toronto, Toronto, Ontario, Aug. 2016.
4. **Giang, W.C.W.**, Donmez, B., MacDonald, R.D. (2014). Interpreting Visualizations of Historical Variability. (Presentation) 15th Annual Human Factors Inter-University Workshop, Buffalo, New York, Nov. 2014. **Won Best Speaker Award.**
5. Kerimov, E., **Giang, W.C.W.**, Donmez, B., (2013). Investigating the Impact of Weather on Interfacility Medical Transfers. (Presentation) Undergraduate Engineering Research Day – 2013 Conference, University of Toronto, Toronto, Ontario, Aug. 2013.
6. **Giang, W.C.W.**, Donmez, B., MacDonald, R.D. (2013). The Influence of Uncertainty Information about Continuous Data on Decision Making: A Proposed Study. (Presentation) 14th Annual Human Factors Inter-University Workshop, Waterloo, Ontario, Nov. 2013. **Won Best Speaker Award.**
7. **Giang, W.C.W.**, Donmez, B., MacDonald, R.D. (2012). Supporting Evidence-Based Time-Critical Decisions. (Presentation) 13th Annual Human Factors Inter-University Workshop. Toronto, Ontario, Nov. 2012.
8. **Giang, W.**, Burns C.M. (2011). Temporal Rate Synchrony Perception in Unimodal and Multimodal Interfaces. (Presentation) 12th Annual Human Factors Inter-University Workshop. Buffalo, New York, Nov. 2011.
9. **Giang, W.**, Burns C.M. (2010). Use of Temporal Synchrony as a Method for Showing Crossmodal Data Relationships. (Presentation) 11th Annual Human Factors Inter-University Workshop. Waterloo, Ontario, Canada, Nov. 2010.
10. **Giang, W.**, Sathananthan, G., Lamb, M., Keillor, J (2007). Assisted Target Detection: Does Cue Brightness Matter? (Presentation) 8th Annual Human Factors Inter-University Workshop. Waterloo, Ontario, Canada, Nov. 2007.
11. Momtahan, K., Burns, C., Sherrard, H., Labinaz, M., Mesana, T., Enomoto, Y., Ho, V., Caves, W., **Giang, W.**, Pajek, D., Saunders, C. (2006). The CARDIO Project (Cardiac Algorithms Research and Development in Operation). (Poster) Ontario Ministry of Health and Long-Term Care Celebrating Innovations in Health Care Expo, Toronto, April 19-20.
12. Momtahan, K., Burns, C., Sherrard, H., Labinaz, M., Mesana, T., Enomoto, Y., Ho, V., Caves, W., **Giang, W.**,

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## TEACHING AND MENTORSHIP

*Graduate Course Instructor*, University of Toronto, Toronto, Ontario, Fall 2014, 2015

*KMDI 1001 – Theory and Methods in Knowledge Media Design*

- Compulsory course for the School of Information's Knowledge Media Design Collaborative Program and the Faculty of Medicine's Translational Research Program
- Re-designed curriculum with a focus on research methods (quantitative and qualitative) in collaboration with a co-instructor
- Created a new syllabus, selected weekly readings, wrote lecture slides and material, and designed assignments for the course, conducted weekly 3 hour lectures
- Course enrollment: 25 (2014), 30 (2015)

*Teaching Assistantships*

Probability and Statistics, *STA 276*, University of Toronto, 2013-2016

Prof. Donmez

Case Studies in Ergonomics, *MIE 345*, University of Toronto, 2013; 2015

Prof. St-Cyr

Experimental Methods (Grad Course), *MIE 1402*, University of Toronto, 2014

Prof. Chignell

Statistical Models in Empirical Research (Grad Course), *MIE 1413*, University of Toronto, 2013

Prof. Donmez

Probability, *MIE 236*, University of Toronto, 2012

Prof. Donmez

Introduction to Human Factors, *SYDE 162*, University of Waterloo, 2009; 2011

Prof. Burns

Cognitive Ergonomics, *SYDE 543*, University of Waterloo, 2009; 2010

Prof. Histon

Introduction to Design, *SYDE 361*, University of Waterloo, 2010

Prof. Zelek

### Supervised Undergraduate Theses (with Prof. Donmez)

- Lavinia Hui (2016) *Dispatch Decision Making in an Air Medical Transport System*.
- Alex Zhou (2015) *Hazard Perception: A Comparison between Drivers Engaging with Smartphone and Smartwatch Notifications*

### Supervised Undergraduate/MEng Students

- 2017: *Uncertainty Visualizations*: Xiaonian He, Quin El-Hage
- 2016: *Wearables in Distracted Driving*: Sam Zhang / *Ornge*: Lavinia Hui, Ana Medinac
- 2015: *Wearables in Distracted Driving*: Alex Zhou, Ines Shanti (MEng), Sabrina Ralph/ *Ornge*: John Loures, Vickey Jiang
- 2014: *Ornge*: Areeba Zakir, Alexandra Portolos, Roger Luo / *Wearables in Distracted Driving*: Kenny Kim, Carl Lam, Mustafa Shaikh, Matt Agostini
- 2013: *Ornge*: Emil Kerimov, David Belvedere

### Guest Lectures and Invited Talks

1. **Giang, W.C.W.** (2016). Random Variables (Guest Lecture). STA 286 – Probability and Statistics, University of Toronto, Jan. 2016.
2. **Giang, W.C.W.** (2015). Grad School Symposium (Invited Talk). Galbraith Society, University of Toronto, Oct. 2015.
3. **Giang, W.C.W.** (2015). Discrete Probability Distributions (Guest Lecture). STA 286 – Probability and Statistics, University of Toronto, Feb. 2015.
4. **Giang, W.C.W.** (2015). Task Analysis (Guest Lecture). MIE 240 – Human Centred Systems Design, University of Toronto, Jan. 2015.
5. **Giang, W.C.W.** (2014). Conquering Research Writing: The Article (Invited Talk). Galbraith Society, University

of Toronto, Oct. 2014.

6. **Giang, W.C.W.** (2012). Supporting Evidence-Based Decisions in Urgent and Emergent Inter-Facility Medical Transportation (Guest Lecture). MIE 345 – Case Studies in Ergonomics, University of Toronto, Nov. 2012.
7. **Giang, W.** (2010). Multimodal Interfaces. (Guest Lecture). SYDE 543 – Cognitive Ergonomics, University of Waterloo, Nov. 2010.
8. **Giang, W.** (2009). Multimodal Interfaces. (Guest Lecture). SYDE 543 – Cognitive Ergonomics, University of Waterloo, Nov. 2009.

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## SERVICE

Publication Co-Chair, 10 <sup>th</sup> International ACM Conference on Automotive UI (2018)	2017-2018
Session Chair, International Symposium on Human Factors and Ergonomics in Healthcare (2018)	2018-2018
Committee Member, HFES – Social Networking and Operations Committee	2013-2014
<ul style="list-style-type: none"><li>• Responsible for helping HFES operate its social networking outreach program</li></ul>	
Executive Member, University of Toronto Human Factors Interest Group	2013-2014
<ul style="list-style-type: none"><li>• Toronto’s Student Chapter of Human Factors and Ergonomic Society</li><li>• Served as Co-President (2014) and Vice-President (2013)</li><li>• Chapter awarded Gold Award in 2013, 2014</li></ul>	
Executive Member, University of Waterloo Human Factors and Ergonomic Society Student Chapter	2010-2011
<ul style="list-style-type: none"><li>• Served as President (2011) and Treasurer (2010)</li></ul>	
Vice-President, Systems Design Engineering Graduate Student Association	2010-2011
Journal Paper Reviewer for Journal for Cognitive Engineering and Decision Making	
Conference Paper Reviewer for ACM CHI Conference on Human Factors in Computing Systems 2017	

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## PROFESSIONAL AFFILIATIONS

Student Member, SIGCHI	2014 – Present
Student Member, IEEE; IEEE Systems, Man, and Cybernetics (SMC) Society	2013 – Present
Student Member, American Statistical Association	2013 – Present
Student Member, Human Factors and Ergonomics Society; Cognitive Engineering and Decision Making Technical Group; Healthcare Technical Group; Perception and Performance Technical Group; Surface Transportation Technical Group	2009 – Present