Christine Murad

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About Me

I am a PhD Candidate in Computer Science at the University of Toronto. I completed my Honours B.Sc in Computer Science (2017) and my MSc in Computer Science (2019) from the University of Toronto. My research looks at the usability and design of conversational voice interfaces, and the development of different tools and resources to aid designers in CUI & VUI design and education – with a particular focus on the development of design guidelines. My research also explores how to bridge the industry-academia gap in CUI & VUI design, and how to improve knowledge transfer between the two. I've published CUI research and organized CUI workshops across several international SIGCHI venues such as CHI, IUI, MobileHCI, CSCW, CUI, etc. I've been part of the CUI steering committee since its inception in 2019.

Education

University of Toronto   Jan 2019 - Present
Doctor of Philosophy – Computer Science, Human-Computer Interaction
- **Thesis Title:** *Supporting Designers in Voice User Interface Design*

University of Toronto   Sept 2017 – June 2019
Master of Science – Computer Science, Human-Computer Interaction
- **Thesis Title:** *Designing for Voice: From GUI to VUI Usability Heuristics*

University of Toronto   Sept 2012 – June 2017
Honors Bachelor of Science – Computer Science Specialist, Sociology Minor

Publications

Refereed Full Conference & Journal Papers:
1. **Murad, C.**, Candello, H., & Munteanu C. 2023. **What's the Talk on VUI Guidelines? A Meta-Analysis of Guidelines for Voice User Interface Design**. In Proceedings of CUI 2023.
2. **Murad, C.**, Tasnim, H., & Munteanu, C. 2022. **"Voice-First Interfaces in a GUI-First Design World": Barriers and Opportunities to Supporting VUI Designers On-the-Job**. In Proceedings of CUI 2022.
3. **Murad, C.**, Munteanu, C., Cowan, B. R., & Clark, L. 2021. **Finding a New Voice: Transitioning Designers from GUI to VUI Design**. Proceedings of CUI 2021.
4. **Murad, C**. & Munteanu, C. (2020). **Designing Voice Interfaces: Back to the (Curriculum) Basics.** In Proceedings of CHI '20
5. Sultanum, N., **Murad, C.** & Wigdor, D. 2020. **Understanding and Supporting Academic Literature Review Workflows with LitSense**. In Proceedings of AVI 2020.
6. *Murad, C.*, Munteanu, C., Cowan, B. R., & Clark, L. (2019). **Revolution or Evolution? Speech Interaction and HCI Design Guidelines.** In IEEE Pervasive Computing. *(Best Paper)*
7. Clark, L., Pantidi, N., Cooney, O., Garaialde, D., Edwards, J., Spillane, B., **Murad, C**., Munteanu, C., Wade, V., & Cowan, B. R. (2019). **What Makes a Good Conversation? Challenges in Designing Truly Conversational Agents.** In Proceedings of CHI '19. **(Best Paper Award – Honourable Mention)**

Refereed Workshops and Courses:
1. **Murad, C**., Munteanu, C., Cowan, B.R., Clark, L., Porcheron, M., Fischer, J.E., Candello, H., & Langevin, R. 2023. **Is CUI Design Ready Yet? A Workshop on Community Practices and Gaps in CUI Design & Resource Development.** In Proceedings of CUI 2023 (Extended Abstracts).
2. **Murad, C**., Munteanu, C., Cowan, B., Clark, L., Porcheron, M., Candello, H., Schlogl, S., Aylett, M., Sin, J., Moore, R., Hughes, G., & Ku, A. 2021**. Let's Talk About CUIs: Putting Conversational User Interface Design Into Practice.** In Proceedings of CHI 2021 (Extended Abstracts).

3. Munteanu, C., Penn, G., & **Murad, C.** 2021. **"Conversational Voice User Interfaces: Connecting Engineering Fundamentals to Design Considerations.** In Proceedings of CHI 2021 (Extended Abstracts).
4. Doyle, P., Rough, J., Cowan, B., Clark, L., Porcheron, M., Schlogl, S., Torres, M. E., Munteanu, C., **Murad, C.**, Sin, J., Lee, M., Aylett, M., & Candello, H. 2021. **CUI@IUI: Theoretical and Methodological Challenges in Intelligent Conversational User Interface Interactions.** In Proceedings of IUI 2021.
5. Porcheron, M., Clark, L., Jones, M., Candello, H., Cowan, B. R**., Murad, C.**, Sin, J., Aylett, M., Lee, M., Munteanu, C., Fischer, J., Doyle, P., Kaye, J. 2020**. CUI@CSCW: Collaborating through Conversational User Interfaces.** In Proceedings of CSCW 2020 (Extended Abstracts)
6. Candello, H., Cowan, B., Munteanu, C., Fischer, J., Clark, L., Schlogl, S., Sin, J., **Murad, C.**, Torres, M. I., Reeves, S., Porcheron, M. & Myers, C. (2020).**CUI@CHI: Mapping Grand Challenges for the Conversational User Interface Community.** In Proceedings of CHI 2020 (Extended Abstracts).
7. Munteanu, C., Clark, L., Cowan, B., Schlogl, S., Torres, M. E., Edwards, J., **Murad, C.**, Aylett, M., Porcheron, M., Candello, H. & Doyle, P. (2020). **CUI – Conversational User Interfaces: A Workshop on New Theoretical and Methodological Perspectives for Researching Speech-based Conversational Interactions.** In Proceedings of IUI' 20.
8. Clark, L., Cowan, B., Edwards, J., Munteanu, C., **Murad, C.**, Aylett, M., Moore, R., Edlund, J., Szekely, E., Healey, P., Harte, N., Torre, I., Gilmartin, E., and Doyle, P. (2019*). Mapping Theoretical and Methodological Perspectives for Understanding Speech Interface Interactions.* In Proceedings of CHI'19 - Extended Abstracts.

Refereed Workshop & Short Papers:
1. **Murad, C.** & Munteanu, C. 2020. **"Alexa, How Do I Build a VUI Curriculum?".** In Proceedings of CUI 2020.
2. *Murad, C*. & Munteanu, C. (2019)**. "I Don't Know What You're Talking About HALexa": The Case for Voice User Interface Guidelines. In Proceedings of CUI '19** *(Best Paper Award – Honourable Mention)*
3. **Murad, C**. (2019*). Tools for Voice User Interface Design.* In Proceedings of MobileHCI '19 Adjunct
4. **Murad, C**., Munteanu, C., & Steurzlinger, W. (2019*).* **Effects of Word Error Rate on ASR Correction Interfaces for Mobile Text Entry**. In Proceedings of MobileHCI '19 Adjunct.
5. **Murad, C**., Munteanu, C. (2019). **Teaching for Voice: The State of VUI Design in HCI Education.** In Proceedings of EduCHI '19 Symposium
6. **Murad, C**., Munteanu, C., Cowan, B. R, & Clark, L. (2018) **Design Guidelines for Hands-Free Speech Interaction.** In Proceedings of MobileHCI '18 Adjunct. *(Best Poster Award – Honourable Mention)*
7. **Murad, C**. & Munteanu, C. (2018). **Designing Accessible Conversational Interfaces for Older Adults: The Case for New Usability Guidelines.** In Proceedings of the CSCW 2018 Workshop on Accessible Voice Interfaces.
8. Axtell, B., **Murad, C.**, Cowan, B. R., Munteanu, C., Clark, l., & Doyle, P. (2018). **Hey Computer, Can We Hit the Reset Button on Speech?** In Proceedings of CHI 2018 Workshop on Voice-based Conversational UX Studies and Design.

Research Experience

Research Associate, *University of Waterloo*   Jan 2024 – Present
- Exploring the design of usable privacy in voice-based IOT agents for older adults

PhD Thesis Research, *University of Toronto*   Jan 2019 – Present
- **Thesis Title:** *Supporting Designers in Voice User Interface Design*
- Exploring the design of conversational voice interfaces, and developing tools and heuristics to assist designers in designing for VUIs and educating about VUI design
- Conducted extensive meta-analyses of existing literature in VUI guidelines and VUI design
- Conducted large-scale survey with industry GUI and VUI designers on current practices, tools, and perceptions in VUI design in industry
- Conducting Delphi panel of guidelines that I developed through a synthesis of 336 guidelines proposed in academic literature

Master's Thesis Research, *University of Toronto* Sept 2017 – Jan 2019
- **Thesis Title:** ***Designing for Voice: From GUI to VUI Usability Heuristics***
- Exploring the design of conversational voice interfaces for older adults, and the development of design guidelines to improve conversational voice interaction
- Conducted cognitive walkthroughs, heuristic evaluations, and brainstorming sessions with user interface experts to brainstorm different types of existing VUI issues in Google Home and Amazon Echo, and to brainstorm potential new guidelines

Research Intern, *University of Toronto* May 2017 – Aug 2017
- Performed research in the Dynamic Graphics Project lab, to develop and evaluate a web application that assists researchers in the literature review workflow
- Conducted formative interviews to gather information about academics current methods of performing bibliography searches and literature reviews
- Conducted think-aloud user-testing observing the usage of our newly developed web application, with follow-up interviews discussing usage experience

Undergraduate Research Project, *University of Toronto* Jan 2016 - April 2016
- Assisted PhD student in the Technologies for Aging Gracefully Lab, performing research about how existing text annotation software is applied to university level teaching and course material annotation

Other Academic Research Projects

Autocorrection of Speech Recognition Errors Using Confusion Network GUI Jan 2017 - Present
- Developed a graphical web interface in Node.JS that shows a visual representation of a speech recognition confusion network, from a lattice, that can be manipulated through touch in order to correct speech recognition errors (based on "Parakeet" by Vertanen et. al [IUI '09])
- Used Kaldi Speech Recognition System, with a public language model, in order to create lattices of thousands of sentences to be used in the interface (which was fed with text-to-speech voices of short 7-word sentences), and Python to conduct processing of sentences to be used
- Designing a Wizard of Oz study to assess whether word error rate and density affect the amount of effort required to correct speech recognition errors using a graphical representation of a confusion network

Teaching Experience

Course Instructor, *University of Waterloo* Jan 2024 - Present
- SYDE542: Interface Design (1 appointment)

Teaching Assistant, *University of Toronto* Sept 2014 -Dec 2023
- CSC404: Introduction to Video Game Design (1 appointment)
- CCT380: Human-Computer Interaction and Communication (3 appointments, 2 Head TA)
- CSC318: Design of Interactive Computational Media (2 appointments)
- CSC209: Software Tools and Systems Programming (1 appointment)
- CSC197: What, Who, How: Privacy in the Age of Big Data Collection (1 appointment)
- CSC148: Introduction to Computer Science (7 appointments, 1 Lead Assignment TA)
- CSC110: Foundations of Computer Science I (2 appointments, 1 Lead TA)
- CSC108: Introduction to Computer Programming (2 appointments)

Professional Experience

Software Developer, *University of Toronto* May 2016 – Aug 2016

- Worked on software called "Markus", using Ruby on Rails and PostgreSQL to develop a code review feature which would allow students to be able to review code that their classmates submitted for an assignment

Software Developer, *WaveDNA*   May 2015 – Aug 2015
- Worked on developing a new product called "Liquid Harmony" in Java that allows you to create music by sketching out a melody and being able to edit different components of music.

IT Business Operations Support,

Ontario Institute of Studies in Education   Sept 2014 – Dec 2014
- Provided administrative support to the Education Commons Business Officer
- Completed projects as given by the Business Officer in relation to inventory, financial administration, technical support

Information Technology Service & Support Analyst,

Ontario Institute of Studies in Education   Sept 2013 – Aug 2014
- Attended to equipment reservations and lab bookings for faculty in the department, as well as external clients
- Set up, work with, and assist with technical problems with projectors, sound systems, teaching stations, etc. within OISE, along with general help desk client service

Professional and Conference Activities

- Steering Committee Member for CUI (Conversational User Interfaces) Conference (2019-Present)
- Organizing Committee Member for CUI 2020 – 2024
    - Workshops Co-Chair (2024)
    - Provocations Co-Chair (2023)
    - Demos Co-Chair (2022)
    - Showcases Co-Chair (2020-2021)
- Associate Chair (Understanding People – Qualitative Methods Subcommittee) for CHI 2023
- Session Chair for CUI 2019 & CUI 2023
- Panelist in "Ethics in Conversational UI" Industry Panel
- Conference Reviewer:
    - MobileHCI 2018 (poster track)
    - MobileHCI 2019 (full paper track)
    - CHI 2019 (late breaking works)
    - CUI 2019 (showcase and provocation paper track)
    - GI 2020 (full paper track)
    - EduCHI Symposium 2020 (all tracks)
    - CHI 2020-2021 (late breaking work)
    - CHI 2020-2023 (full paper track)
    - CUI 2020-2022 (all tracks)
    - DIS 2020-2023 (papers and pictorials track)
    - CSCW 2021-2022 (full paper track)
- Journal Reviewer:
    - Transaction on Computer-Human Interaction (TOCHI) (2021; 2023)
    - International Journal of Human-Computer Studies (2021-2023)
    - Behaviour and Information Technology (2022)
    - International Journal of Human-Computer Interaction (2023)

Presentations and Workshops

Symposium & Paper Talks:
- *What's the Talk on VUI Guidelines? A Meta-Analysis of Guidelines for Voice User Interface Design.* (2023). Presented at CUI 2023 in Eindhoven

- *"Voice-First Interfaces in a GUI-First Design World": Barriers and Opportunities to Supporting VUI Designers On-the-Job.* (2022). Presented at CUI 2022 in Glasgow.
- *Finding a New Voice: Transitioning Designers from GUI to VUI Design.* (2021). Presented virtually at CUI 2021
- *"Alexa, How Do I Build a VUI Curriculum?"* (2020). Presented virtually at CUI 2020.
- *Designing Voice Interfaces: Back to the (Curriculum) Basics.* (2020). Presented virtually at TorCHI.
- *"I Don't Know What You're Talking About HALexa": The Case for Voice User Interface Guidelines.* (2019). Presented at CUI 2019 in Dublin.
- *Teaching for Voice: The State of VUI Design in HCI Education*. (2019). Presented at EduCHI 2019 Symposium in Glasgow.

Poster Presentations:
- *Tools for Voice User Interface Design* (2019)*.* Presented at MobileHCI '19 in Taiwan.
- *Effects of Word Error Rate on ASR Correction Interfaces for Mobile Text Entry.* (2019). Presented at MobileHCI '19 in Taiwan.
- *Design Guidelines for Hands-Free Speech Interaction.* (2018). Presented at MobileHCI '18 in Taiwan.

Workshop & Symposium Organizing & Attendances:
- CUI 2023 – "*Is CUI Design Ready Yet? A Workshop on Community Practices and Gaps in CUI Design & Resource Development",* Lead Workshop Organizer
- CHI 2023 – *"CUI@CHI: Inclusive Design of CUIs Across Modalities and Mobilities"*, Attendee
- CHI 2021 *"Let's Talk About CUIs: Putting Conversational User Interface Design Into Practice"*, Lead Workshop Organizer
- CSCW 2020 *"CUI@CSCW: Collaborating through Conversational User Interface",* Workshop Organizer
- CHI 2020 "*CUI@CHI: Mapping Grand Challenges for the Conversational User Interface Community"*, Workshop Organizer + Attendee
- MobileHCI 2019 Doctorial Consortium Attendee
- EduCHI 2019 Symposium Attendee
- CHI 2019 "*Mapping Theoretical and Methodological Perspectives for Understanding Speech Interface Interactions*" Workshop Organizer + Attendee
- MobileHCI 2018 "*Designing Speech and Language Interactions for Mobiles and Wearables*" Workshop Attendee
- CSCW 2018 "*Accessible Voice Interfaces*" Workshop Attendee
- CHI 2018 "*Voice-Based Conversational UX Studies and Design*" Workshop Attendee

Awards and Honours

Wolfond Fellowship, *University of Toronto*	Jan 2024 – Apr 2024
Doctoral Completion Award, *University of Toronto*	Sep 2023 – Apr 2024
NSERC Canadian Graduate Scholarship – Doctoral	Jan 2021 – Jan 2024
Wolfond Fellowship, *University of Toronto*	Sept 2019 – Aug 2020
Bell Graduate Scholarship, *University of Toronto*	Sept 2019 – Aug 2020
2019 Best Journal Paper, *IEEE Pervasive Computing*	Sep 2019
Best Paper Award – Honourable Mention, *CUI 2019*	Aug 2019
Best Paper Award – Honourable Mention, *CHI 2019*	Apr 2019
Best Poster Award – Honourable Mention, *MobileHCI 2018*	Sept 2018
Robert E. Landsale/Okino Computer Graphics Graduate Fellowship, *University of Toronto* Nov 2018 / Nov 2017	
Gordon Cressy Student Leadership Award, *University of Toronto*	Feb 2017
Chancellor's Scholarship – Ashbaugh, *Trinity College, University of Toronto*	Oct 2016

Academic Community Involvement

Conference Student Volunteer   Oct 2018 – Apr 2020
- SIGCHI Executive Committee Volunteer
- MobileHCI 2018
- CHI 2020

Undergraduate Department Committee – Undergraduate Representative,   Sept 2016 – Apr 2017
Department of Computer Science, University of Toronto
- Assisted in advising the Chair and Associate Chair – Undergraduate on academic issues related to computer science undergraduate courses and programs

Assistant/Peer Mentor, *University of Toronto*   Sept 2013 – Apr 2017
- Assistant and Peer Mentor in First Year Learning Communities program, that assisted first year students entering the Computer Science discipline
- Plan bi-weekly sessions which ranged from Academic, Social, and Development sessions
- Act as and provided resources for students to utilize in their university experience
- Mentor students by teaching professional development skills

Technical Skills

Languages: Python, Java, HTML/CSS/Javascript, C#, R, PostgreSQL, mySQL/SQLite, ReactJS, Node.JS, Android, XML, RubyOnRails
Technologies: Github and Git Workflow, Unity3D, Google Dialogflow
Experience: User Experience Research, Video Game Design, Web Design, Conversational Voice Interface Design

Spoken Languages

Fluent in English (native), Chaldean (bilingual speaking proficiency), French (professional proficiency: writing and reading, conversational: speaking)