

# Johann Wentzel

HCI Researcher - Virtual and Augmented Reality - Accessibility

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## Education

### University of Waterloo

*Doctor of Philosophy (PhD) - Computer Science (Human-Computer Interaction), GPA: 96%*

**Thesis (in progress):** *Bring-Your-Own Input: Context Aware Multi-Modal Input for More Accessible VR*

**Advisor:** Daniel Vogel [[website](#)]

Waterloo, ON

May 2020 - Present

### University of Waterloo

*Master of Mathematics - Computer Science, GPA: 96%*

Thesis-based program [[T1](#)], resulting in an award-winning publication [[C2](#)].

Waterloo, ON

Sept 2018 - Apr 2020

### University of Calgary

*Bachelor of Science - Computer Science, GPA: 96%*

Graduated with First Class Honours (published paper [[C1](#)] plus high GPA).

Calgary, AB

Sept 2011 - Jun 2017

### University of Calgary

*Bachelor of Commerce - Business Technology Management (BTMA), GPA: 96%*

Winner of Haskayne School of Business Silver Medallion (highest graduating GPA in BTMA program).

Calgary, AB

Sept 2011 - Jun 2017

## Work Experience

### Meta Reality Labs

*Research Scientist Intern, Input Explorations*

- Developed prototypes of multimodal AR/VR interfaces, involving eye tracking and EMG.
- Designed and facilitated experiments to evaluate AR/VR eye tracking input accuracy.
- Analyzed and presented experiment results and high-level conclusions to stakeholders.

New York, NY

Sept 2022 - Jan 2023

### Microsoft Research

*Research Intern, Ability Team*

- Primary author and developer on a VR accessibility research experiment involving multimodal VR input and 3D input remapping.

Redmond, WA (Remote)

Jun 2022 - Sept 2022

*Research Intern, Ability Team*

- Primary author of an accessibility research publication [[C3](#)] using qualitative methods to investigate the use of multi-device input configurations by people with mobility limitations.

May 2021 - Aug 2021

### Autodesk Research

*Research Intern, User Interface Research Group*

- Primary author and sole developer for a research paper on hybrid VR-desktop interfaces, resulting in a patent [[P1](#)] and conference publication [[C4](#)].

Toronto, ON

Jan 2020 - May 2020

### New York University

*Visiting Scholar, Future Reality Lab*

- Developed a simultaneous, multi-user augmented reality audio solution for an external client.
- Solo developer for a multiplayer iOS project using ARKit on iPhone and iPad.

New York, NY

Sept 2019 - Dec 2019

### Deloitte

*iOS/Web/AR Developer (Business Technology Analyst)*

- Created an iOS app for navigation and SAP Cloud interaction, implementing OCR functions and a custom keyboard UI.
- Created an AR eCommerce demo for industry clients using Unity, Vuforia, and Node.js.

Calgary, AB

Aug 2017 - Aug 2018

### Critical Mass

*User Experience Design Intern*

- Created interactive design prototypes for user testing, using code-based animation tools.
- Created and annotated user flows and wireframes for various websites and software.

Calgary, AB

May 2016-- Aug 2016

## University of Calgary

### Undergraduate Researcher

- Developed an augmented reality interface between Google Glass, Kinect, and a Baxter humanoid robot.
- Published study findings as first author [C1], winning a Calgary Undergraduate Research Award.

Calgary, AB

Sept 2014 - Sept 2015

## SMART Technologies

### User Experience Design Intern

- Created automated data entry scripts to track and close user feature requests, reducing manual entry time by 50%.
- Created various full-process mockups for products, from concepts and sketches to videos and interactive prototypes.

Calgary, AB

May 2014 - Aug 2014

## Publications

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**Note about conference papers:** In Human-Computer Interaction, conference proceedings are the preferred publication venue since they are timelier and typically have the greatest impact. Top-tier conferences are very selective with rigorous multi-stage reviews of full manuscripts creating high quality fully archival proceedings.

**Note about venues:** CHI (ACM Conference on Human Factors in Computing Systems) is recognized as a very top tier HCI conference (ranked #1 on Google Scholar). The average acceptance rate for CHI is 23%.

### Peer-Reviewed Publications

- [C4] **Johann Wentzel**, Fraser Anderson, George Fitzmaurice, Tovi Grossman, Daniel Vogel. 2024. *SwitchSpace: Understanding Context-Aware Peeking Between VR and Desktop Interfaces*. To appear in Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24).
- [C3] **Johann Wentzel**, Sasa Junuzovic, James Devine, John Porter, Martez Mott. 2022. *Understanding How People with Limited Mobility Use Multi-Modal Input*. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '22). DOI: <https://doi.org/10.1145/3491102.3517458>
- [C2] **Johann Wentzel**, Greg d'Eon, and Daniel Vogel. 2020. *Improving Virtual Reality Ergonomics through Reach-Bounded Non-Linear Input Amplification*. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '20). DOI: <https://doi.org/10.1145/3313831.3376687>  
\* **Best Paper Honourable Mention (top 5% of submitted papers)**
- [C1] **Johann Wentzel**, Daniel Rea, James Young, and Ehud Sharlin. 2015. *Shared Presence and Collaboration Using a Co-Located Humanoid Robot*. In Proceedings of the 3rd International Conference on Human-Agent Interaction (HAI '15). DOI: <https://doi.org/10.1145/2814940.2814995>
- [E4] **Johann Wentzel**. 2023. *Bring-Your-Own Input: Context-Aware Multi-Modal Input for More Accessible Virtual Reality*. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '23 Doctoral Consortium). DOI: <https://doi.org/10.1145/3544549.3577056>
- [E3] **Johann Wentzel** and Lesley Istead. 2022. *Volumetric and User-Centric Rendering Techniques for Lens Flare and Film Grain in Virtual Reality Environments*. In the 2022 European Conference on Visual Media Production Extended Abstracts (CVMP '22). [PDF]
- [E2] **Johann Wentzel**, Daekun Kim, and Jeremy Hartmann. 2021. *Same Space, Different Place: Designing for Differing Physical Spaces in Social Virtual Reality*. In the CHI 2021 workshop "Social VR: A New Medium for Communication and Collaboration". [More info | PDF]
- [E1] Josh Urban Davis, **Johann Wentzel**. 2021. *Font Your Friends and Loved Ones: On the Utility of Ugly Interfaces*. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21). DOI: <https://doi.org/10.1145/3411763.3450371>

### Patents

- [P1] **Johann Wentzel**, Fraser Anderson, Tovi Grossman, and George Fitzmaurice. *Transitions between states in a hybrid virtual reality desktop computing environment*. 2022. [Google Patents]

## Theses and Dissertations

- [T1] **Johann Wentzel**. 2020. Reach-Bounded, Non-Linear Input Amplification for More Comfortable Virtual Reality. Master's thesis, UWSpace. [Link]

## Awards and Funding

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- 2021-2024 **Alexander Graham Bell Graduate Scholarship (NSERC CGS-D)** (national) - \$105,000 over 3 years  
Awarded to top PhD students based on academic merit, research potential, and leadership.
- 2021-2024 **President's Graduate Scholarship** (institutional) - \$30,000 over 3 years  
Top-up funding awarded by University of Waterloo to winners of the NSERC CGS-D.
- 2021 **Ontario Graduate Scholarship, PhD** (provincial, declined for NSERC CGS-D) - \$15,000  
Awarded to top PhD students based on academic excellence and research potential.
- 2020 **Best Paper Honourable Mention (top 5% of submitted papers), CHI 2020**  
for [C2] "Improving Virtual Reality Ergonomics [...]" with Greg d'Eon and Daniel Vogel.
- 2020 **Ontario Graduate Scholarship, PhD** (provincial) - \$15,000  
Awarded to top PhD students based on academic excellence and research potential.
- 2020 **President's Graduate Scholarship** (institutional) - \$5,000  
Top-up funding awarded by University of Waterloo to winners of provincial scholarships.
- 2019 **Alexander Graham Bell Graduate Scholarship (NSERC CGS-M)** (national) - \$17,500  
National scholarship for top Master's students based on academics and research potential.
- 2019 **Ontario Graduate Scholarship, Master's** (provincial) - \$15,000  
Provincial scholarship for top Master's students based on academic excellence and research potential.
- 2019 **David Johnston International Experience Award** (institutional) - \$2,500  
Awarded to graduate students to support international work and study opportunities.
- 2018 - 2022 **David R. Cheriton Graduate Scholarship** (institutional) - \$20,000 over 2 years, won twice  
Awarded to top graduate students based on academic excellence and research potential.
- 2018 **President's Graduate Scholarship** (institutional) - \$5,000  
Awarded to top Master's students based on academic excellence and research potential.
- 2018 **Domestic Masters Entrance Award** (institutional) - \$5,000  
Awarded to top incoming Master's students based on academic excellence.
- 2018 **Alexander Graham Bell Graduate Scholarship (NSERC CGS-M)** (national, declined) - \$17,500  
Offered from University of Saskatchewan and Calgary, declined as I chose to attend Waterloo.
- 2017 **Haskayne School of Business Silver Medallion in Business Technology Management**  
Awarded to the Business Technology Management student with the highest graduating GPA.
- 2016 **University of Calgary Undergraduate Merit Award** (institutional) - \$800  
Awarded to top continuing undergraduate students.
- 2015 **Program for Undergraduate Research Experience Award** (institutional) - \$6,000  
Merit-based research funding for undergraduate students in the UCalgary Honours program.
- 2014 **Alistair H. Ross Memorial Scholarship** (institutional) - \$3,750  
Awarded to top continuing undergraduate students based on GPA.
- 2011 **President's Admission Scholarship** (institutional) - \$2,500  
Awarded to top incoming undergraduate students based on academic excellence.
- 2011-2017 **Dean's List, University of Calgary**  
Maintained a GPA above 3.6/4.0 while enrolled full-time in undergraduate studies.

## Supervision

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**Falah Shazib**, University of Waterloo undergraduate, Jan 2021 - Apr 2021

- "Exploring the effects of hierarchy within 3D marking menus in virtual reality"

**Daekun Kim**, University of Waterloo undergraduate, Sept 2020 - Sept 2022

- "Exploring the effects of depth perception in virtual reality"

## Invited Talks

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- **Conference Presentations:** CHI 2022-2024, CHI 2020 (virtual), Waterloo CHI 2020 (virtual)
- **Accessibility Strategies for using Extended Reality in Teaching.** Educause 2023, Chicago, IL, USA

- **Incorporating Emerging Technologies into Higher Education with Care: Accessibility Strategies for Virtual Reality and Augmented Reality.** UWaterloo Teaching and Learning Conference 2023. Waterloo, ON, Canada.
- **Breaking Into XR Research.** UWaterloo VR Club, Waterloo, ON, Canada
- **Robotics in Manufacturing / Working Alongside Baxter.** ACAMP Seminar Series - Unmanned Vehicles, Robotics, and Intelligent Systems Seminar. Calgary, AB, Canada.
- **Shared Presence and Collaboration with a Co-Located Humanoid Robot.** University of Calgary Undergraduate Research Symposium. Calgary, AB, Canada.

## Press

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- **School of Computer Science News**, interview, 2023. *PhD candidate Johann Wentzel makes virtual reality more accessible.* <https://cs.uwaterloo.ca/news/phd-candidate-johann-wentzel-makes-virtual-reality-more-accessible>
- **University of Waterloo News**, interview, 2023. *Waterloo doctoral candidate focuses on ways to make virtual reality more accessible.* <https://uwaterloo.ca/news/mathematics/virtual-reality-accessible>
- **Government Technology**, interview, 2022. *What Is the Metaverse's Future in K-12 and Higher Ed?* <https://www.govtech.com/education/higher-ed/what-is-the-metaverses-future-in-k-12-and-higher-ed>

## Side Projects

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### Self-Configured Home Server

- A fully self-assembled home server for VPN, file hosting, smart home services, and multiplayer games.
- Configured using Proxmox and Docker, with incoming traffic routed via NGINX.

### VR HCI Research Project: 'Marimba'

- A drum-like virtual keyboard that allows users to type more quickly and comfortably in virtual reality.
- Early user testing showed this technique provided a similar typing speed and lower error rate than others.

## Service and Volunteering

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### Teaching

*Instructional Apprentice, University of Waterloo*

**Waterloo, ON**

*Ongoing*

- Leading computer labs as a lab instructor for undergraduate computer science courses.

### Academic Service

**Waterloo, ON**

*Ongoing*

- **Program Committee:** ISS 2024, GI 2022
- **Session Chair:** Waterloo CHI 2020 (online CHI event in response to COVID-19)
- **Student Volunteer:** UIST 2021, CHI 2021, UIST 2019
- **Peer Reviewer:** CHI, UIST, CHI PLAY, MobileHCI, ISS (all over several years)

### Calgary Community Theatre

**Calgary, AB**

*Actor/Musician*

*Ongoing*

- Cast member, orchestra performer, and technical setup advisor for various musical theatre productions in Calgary.

### University of Calgary Orientation

**Calgary, AB**

*Orientation Leader*

*Sept 2013 - Sept 2015*

- Led large groups of incoming students on tours of campus, including one-on-one advice for campus life.
- Facilitated several campus-wide volunteering events to build awareness of University of Calgary services.

### Alberta Youth Choir

**Calgary, AB**

*Vocalist*

*Oct 2013 - Oct 2015*

- Performed as a vocal bass in a provincial honour choir, offering touring performances in various venues around Alberta.

## Skills

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- **Programming Languages:** C#, Swift, Python, R, HTML, CSS, Javascript, Objective-C, C++
- **Dev tools:** Unity, Xcode, Android Studio, Bootstrap, React, NumPy, jQuery, Wordpress, NodeJS, Git.
- **Hobbies:** Home servers, game development for VR, AR, iOS. Classically trained in piano, clarinet, voice.