Niall L. Williams

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EDUCATION

University of Maryland, College Park, MD, USA — Aug 2019 - Present
Ph.D. in Computer Science
– Research interests: Virtual reality, computer animation, computer vision, human-computer interaction
– Advisor: Dr. Dinesh Manocha

Davidson College, NC, USA — Aug 2015 - May 2019
B.S. with High Honors in Computer Science
– Thesis Title: Estimation and Comparison of Rotation Gain Thresholds for Redirected Walking
– Advisor: Dr. Tabitha Peck

AWARDS

Dean's Fellowship ($5,000 total), University of Maryland, College Park	2019, 2020
Senior Computer Science Award, Davidson College	May 2019
Nominated for CRA Outstanding Undergraduate Researcher Award	Oct 2018
ASA DataFest "Best Use of External Data" Winner	April 2017

RESEARCH EXPERIENCE

Haptics for Improved Understanding of Physical Concepts (perceptproject.weebly.com) — July 2019
Davidson College Mathematics & Computer Science Department — *Davidson, NC*

- **Background:** Haptics can be used to augment the ways we interact with and understand virtual environments. The main question in this work is whether haptic technology can help pre-service elementary school teachers better understand concepts of physics so they are better prepared to teach these concepts in the classroom.
- Implemented features into a physically-based buoyancy simulation to visualize forces and properties of buoyancy with haptic force-feedback.
- Explored the efficacy of different haptic input and feedback modes for future research involving concepts of thrust and drag.

Fitting Psychometric Functions Using Confidence Ratings — Aug 2018 - May 2019
Davidson College Mathematics & Computer Science Department — *Davidson, NC*

- **Background:** Psychophysical experiments typically require large amounts of trial data from each participant, which can negatively affect results as users become fatigued or bored. Using participants' confidence ratings, it may be possible to estimate perceptual detection thresholds using fewer experimental trials.
- Implemented a novel psychometric model described in a publication and applied it to data gathered from a study I previously conducted.
- Researched the viability of using less data without confidence ratings using a novel model described in a publication.

Estimation of Redirected Walking Rotation Gain Thresholds — May 2018 - July 2018
Davidson College Mathematics & Computer Science Department — *Davidson, NC*

- **Background:** Redirected walking allows users to explore virtual environments that are larger than the system's real-world tracked area by slowly manipulating the virtual environment around the user. If the manipulations are too severe, the user's feeling of presence can be broken.

- Designed and programmed a user-study to measure how perceptual thresholds change under different user and system factors including FOV, gender, and distractor presence.
- Ran participants to collect data on imperceptibility of virtual rotation magnitude.
- Found significant effects of FOV, gender, and distractors on perceptual thresholds.

PUBLICATIONS & PRESENTATIONS

Publications

[1] NL Williams and TC Peck. Estimation of rotation gain thresholds considering fov, gender, and distractors. *IEEE transactions on visualization and computer graphics*, 2019

Posters

[1] Niall Williams and Tabitha C Peck. Estimation of rotation gain thresholds for redirected walking considering fov and gender. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pages 1229–1230. IEEE, 2019

Presentations

[1] Measuring Perceptual Limits of Redirected Walking in Virtual Reality, *Davidson College Coffee Talk*, Davidson College, NC, 2018.

TEACHING EXPERIENCE

Computer Science TA Aug 2019 - Present
University of Maryland, College Park *College Park, MD*

- CMSC 420: Advanced Data Structures taught.
- Hold office hours, assist with questions during lectures, and grade assignments.

Computer Science Tutor Aug 2018 - May 2019
Davidson College Center for Teaching & Learning *Davidson, NC*

- Assist peers in learning new programming languages, troubleshooting coding issues and understanding introductory course-related concepts.
- Guide peers toward developing an independent thinking style through open-ended questions.
- Courses tutored: Programming and Problem Solving, Discrete Structures, Data Structures, Computer Organization, Bioinformatics Programming.

Head TA Jan 2019 - May 2019
Davidson College Mathematics & Computer Science Department *Davidson, NC*

- Coordinated shift scheduling for all computer science TAs.
- Liaised with TAs, graders, and professors to resolve any problems throughout the semester.
- Helped guide new graders and TAs by providing advice.
- Worked with the department to create a more structured environment for future graders and TAs.

Computer Science Grader Aug 2017 - Dec 2018
Davidson College Mathematics & Computer Science Department *Davidson, NC*

- Grade and provide feedback on assignments for 20–40 students per semester.
- Feedback includes optimization, debugging, implementations of different data structures, and cleanliness.
- Wrote a script for the department to grade a new homework assignment.
- Course graded: Data Structures.

LEADERSHIP & ADDITIONAL EXPERIENCE

Davidson College ACM Chapter Aug 2018 - May 2019
Co-founder and member *Davidson, NC*

- Helped found and establish the Davidson College ACM Chapter.

Davidson College Bernard Society of Mathematics Aug 2018 - May 2019
Senior Representative *Davidson, NC*

- The Bernard Society is a group focused on promoting student involvement in research, programming competitions, and other departmental events.

Davidson College Hackathon Group Aug 2016 - May 2019
Member *Davidson, NC*

- Compete in coding competitions locally and nationally.

Davidson College Davidson Electronic Sports Union Aug 2015 - May 2019
Co-President and webmaster *Davidson, NC*

- Organize and host tournaments for various competitive video games. Worked with the college to create a public recreational video gaming room.

ACADEMIC MEMBERSHIPS

IEEE Student Member 2019 - Present
Davidson College ACM Chapter 2018 - 2019
Davidson College Bernard Society of Mathematics member 2017 - 2019

PROGRAMMING SKILLS

Languages: Java, C#, C/C++, Python, R
Software Packages and Tools: Unity3D, OpenGL, D3.js, Keras, Scikit-learn, OpenCV, git, LaTeX
Operating Systems: Linux (Ubuntu), Windows, MacOS

REFERENCES

Available on request.