Niall Williams

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EDUCATION

University of Maryland, College Park, MD, USA — Aug 2019 - Present
PhD in Computer Science (MS expected Dec 2021), 3.77 GPA
– Research interests: Virtual/Augmented reality, perception, motion planning, human-computer interaction
– Advisors: Dr. Dinesh Manocha & Dr. Aniket Bera

Davidson College, NC, USA — Aug 2015 - May 2019
B.S. with High Honors in Computer Science, 3.7 GPA
– Thesis Title: Estimation and Comparison of Rotation Gain Thresholds for Redirected Walking
– Advisor: Dr. Tabitha C. Peck

RESEARCH EXPERIENCE

GAMMA Lab, University of Maryland — College Park, MD USA
Research Assistant (Advisors: **Dinesh Manocha, Aniket Bera**) — *Aug 2019 - Present*

- Developing VR locomotion interfaces, using spatial computing and motion planning with the Oculus Quest, that minimize the chance of collision with physical objects to improve immersion in social VR experiences.
- Investigating the efficacy of robust statistical models of human perception that accurately estimate users' perceptual tolerance of visual gains in VR when only low amounts of data are available.
- Investigated and evaluated techniques for synthesizing and retargeting emotionally expressive gaits for realistic virtual avatars in social VR/AR settings.

DRIVE Lab, Davidson College — Davidson, NC USA
Research Assistant (Advisor: **Tabitha C. Peck**) — *May 2018 - Aug 2019*

- Designed and conducted psychophysical experiments to measure users' perceptual tolerance of horizontal visual gains with visual distractions present during locomotion in VR using an HTC Vive.
- Developed a physically-based, haptic buoyancy simulation to render properties of buoyancy under different material properties using Unity and a Novint Falcon controller.

PUBLICATIONS & INVITED TALKS

Journal Papers

[1] **NL Williams**, A Bera, D Manocha. ENI: Quantifying Environment Compatibility for Redirected Walking. *Under review for IEEE Transactions on Visualization and Computer Graphics*, 2022 (Proc. IEEE VR 2022)

[2] **NL Williams**, A Bera, D Manocha. Redirected Walking in Static and Dynamic Scenes Using Visibility Polygons. *IEEE Transactions on Visualization and Computer Graphics*, 2021 (Proc. ISMAR 2021) (19.7% acceptance rate) [Best paper honorable mention] [link]

[3] **NL Williams**, A Bera, D Manocha. ARC: Alignment-based Redirection Controller for Redirected Walking in Complex Environments. *IEEE Transactions on Visualization and Computer Graphics*, 2021 (Proc. IEEE VR 2021) (15.5% acceptance rate) [Best paper honorable mention] [link]

[4] **NL Williams** and TC Peck. Estimation of Rotation Gain Thresholds Considering FOV, Gender, and Distractors. *IEEE Transactions on Visualization and Computer Graphics*, 2019 (Proc. ISMAR 2019) (8.6% acceptance rate) [link]

Conference Papers

[1] U Bhattacharya, N Rewkowski, P Guhan, **NL Williams**, T Mittal, A Bera, D Manocha. Generating Emotive Gaits for Virtual Agents Using Affect-Based Autoregression. *IEEE International Symposium on Mixed and Augmented Reality*, 2020 (22.8% acceptance rate) [link]

Workshop Papers and Posters

[1] **NL Williams**, A Bera, D Manocha. Redirection Using Alignment. *IEEE VR 2021 Locomotion Workshop*, 2021

[2] K Qi, D Borland, E Jackson, **NL Williams**, J Minogue, and T Peck. The impact of haptic and visual feedback on teaching. *IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, 2020

[3] K Qi, D Borland, **NL Williams**, E Jackson, J Minogue, and T Peck. Augmenting Physics Education with Haptic and Visual Feedback. *IEEE VR 2020 Fifth Workshop on K-12+ Embodied Learning through Virtual Augmented Reality (KELVAR)*, 2020

[4] J Minogue, D Borland, T Peck, E Jackson, K Qi, and **NL Williams**. Tracing the development of a haptically-enabled science simulation (hesss) for buoyancy. *NARST Annual International Conference*, 2020

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

Invited Talks

[1] ARC: Alignment-based Redirection Controller for Redirected Walking in Complex Environments, *SIGGRAPH 2021 TVCG Session on VR*, SIGGRAPH 2021. [link]

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

Software

[1] Pasumi: Open-source library for simulating virtual reality locomotion using redirected walking. https://pasumi.github.io/

AWARDS & HONORS

Best Paper Honorable Mention (ISMAR 2021)	2021
Best Paper Honorable Mention (IEEE VR 2021)	2021
Dean's Fellowship, University of Maryland, College Park	2019, 2020
Senior Computer Science Award, Davidson College	May 2019
Nominated for CRA Outstanding Undergraduate Researcher Award	Oct 2018

SKILLS

Computing Skills	C/C++, C#, Python, R, Unity3D, D3.js, git, LaTeX, Windows, Linux
Subjects	Virtual/augmented reality, human-computer interaction, human locomotion, motion planning, visual perception, statistical modelling, computational geometry

PROFESSIONAL SERVICE & COMMUNITY INVOLVEMENT

Program Committee	SIGGRAPH Research Career Development Committee	2021
Peer Reviewing	IEEE TVCG (2021 - present), IEEE VR (2020 - present), ISMAR (2021), MobileHCI (2021)	
Student Volunteer	IEEE VR (2020, 2021), ISMAR (2019)	
University of Maryland	Graduate school application mentor	2020
	Graduate admissions application reviewer	2019 - Present
Davidson College	Math & CS department student representative	2018 - 2019
	Davidson College ACM chapter co-founder	2018 - 2019