

RAHUL ARORA

Research Scientist — Human-Computer Interaction & Computer Graphics

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EXECUTIVE SUMMARY

Research Scientist experienced in architecting multimodal AI wearables and end-to-end 3D graphics systems. Expert in owning sensing stacks (firmware to front-end) and driving ML research through ground-truth algorithms and user experiments. Widely published and patented in computer graphics, AR/VR, and HCI.

CORE COMPETENCIES & TECHNICAL STACK

- **Domains:** HCI, Computer Graphics, AR/VR, Sensing, Gestural Interfaces.
- **Programming Languages:** C#, Unity3D, Python, MATLAB, C++, TypeScript.
- **Techniques:** Sensor Fusion, Spatial Tracking, Inertial Measurement Units (IMUs), Numerical Optimization, Geometry Processing, Quantitative/Qualitative User Studies, Rapid Prototyping.

PROFESSIONAL EXPERIENCE

META PLATFORMS | Reality Labs

December 2021 — Present

Research Scientist (Input Explorations Team)

- **Meta Neural Band:** Led R&D for [critically-acclaimed](#) continuous control gestures from raw sensor data to the OS/application layer on AI glasses. Architected the core sensing pipeline and gesture tracking algorithms and spearheaded development across user studies, prototype engineering, and system integration. Published in [Nature \(2025\)](#).
- **Multimodal Interaction Design:** Evaluated and built next-generation interaction frameworks combining eye/head tracking, computer vision, and surface electromyography (sEMG). Led cross-functional initiatives to define core device control and text-input primitives for future AR and VR computing platforms.
- **Hardware & Ground-Truth Infrastructure:** Directed the development of high-fidelity wearable firmware and custom data-collection systems. Designed and executed rigorous human-subject experiments to validate performance bounds of novel neuromotor sensing modalities.

ADOBE RESEARCH

Summers 2019, 2018, 2013

Research Intern (Multiple Teams)

- **2019 (Seattle):** Developed algorithms for creating stylized animations of 2D fluids from a few keyframes.
- **2018 (Seattle):** Researched and built novel gestural methods for authoring spatial animations directly within VR. Published at [UIST 2019](#).
- **2013 (Bangalore):** Built a gamified crowdsourcing platform to accelerate and improve object recognition tasks for computer vision.

AUTODESK RESEARCH

Winter 2017 & Summer 2016

Research Intern (User Interface Research Team)

- **2017:** Developed an augmented reality tool for 3D concept sketching, mapping real-world physical tablet surfaces to mid-air AR environments. Published at [CHI 2018](#).
- **2016:** Conducted rigorous lab experiments and quantitative analyses to baseline human 3D sketching ability and perception limitations. Published at [CHI 2017](#).

SELECTED PUBLICATIONS

A Generic Noninvasive Neuromotor Interface for Human–Computer Interaction ([Nature 2025](#))

The first high-bandwidth sEMG interface that works out-of-the-box for discrete selection, continuous navigation, and text-input via handwriting. Highly collaborative work across 245 contributors at CTRL-Labs and Reality Labs at Meta.

Mid-Air Drawing of Curves on 3D Surfaces in Virtual Reality ([SIGGRAPH/TOG 2021](#))

An easy-to-implement algorithm for interactive drawing of curves on 3D surfaces in VR. This open-sourced technique is based on the musculoskeletal limitations of mid-air input and was developed after analyzing ten novel alternatives.

MagicalHands: Mid-Air Hand Gestures for Animating in VR ([UIST 2019](#))

An end-to-end system for authoring spatial animations in VR using mid-air hand gestures. The gesture-based controls were designed using an elicitation study with professional animators.

Volumetric Michell Trusses for Parametric Design & Fabrication ([SCF 2019](#))

The first algorithm capable of designing volumetric Michell Trusses. This enables the creation of strong and lightweight objects which can be fabricated using additive manufacturing techniques and easily edited by manipulating an embedded parametrization.

Experimental Evaluation of Sketching on Surfaces in VR ([CHI 2017](#))

A rigorous set of quantitative user studies to characterize the factors that affect the accuracy of mid-air sketching in VR. These foundational results have informed the design of many subsequent experiments and systems in the AR/VR research community (cited over 250 times).

EDUCATION

UNIVERSITY OF TORONTO

2021

Ph.D. in Computer Science

- **Focus:** Computer Graphics and HCI (Advised by Prof. Karan Singh at the [Dynamic Graphics Project Lab](#)).
- **Thesis:** *Creative Visual Expression in Immersive 3D Environments* — Guidelines, algorithms, and tools for overcoming the perceptual and musculoskeletal limits of mid-air input for AR/VR creative workflows.

INDIAN INSTITUTE OF TECHNOLOGY (IIT) KANPUR

2015

Bachelor and Masters of Technology (B.Tech. & M.Tech.) in Computer Science and Engineering

- **Masters Thesis:** *Exploring Design Space by Interpolating Between Multiple Sketches* — [Developed a novel technique](#) for interpolating between multiple early-stage design concepts.
- **Undergraduate Research:** [Improved the computational complexity](#) of the perfect matching problem for $K_{3,3}$ -free or K_5 -free graphs, an important class of non-planar graphs.

SELECTED HONOURS & SERVICE

- **Research Awards:** CHI Best Paper Honorable Mention (2021), Adobe Research Fellowship (2019), Mitacs Accelerate Award (2016).
- **Academic Excellence:** IIT-K Academic Excellence Award (2013), IIT-K Merit Scholarship (2010–2014).
- **Invited Talks:** Invited technical talks and guest lectures at MIT, NYU, Université de Montréal, UBC Vancouver, and Autodesk Research.
- **Academic Service:** Frequent reviewer for top-tier graphics/HCI conferences including SIGGRAPH, SIGGRAPH Asia, UIST, and CHI. Program Committee Member for ICCV workshop on sketching, CHI late-breaking work, SIGGRAPH Asia XR program, and Pacific Graphics.