

1. Summary

An accomplished and recognized international researcher in Visual Computing, Immersive Analytics, AI, and HPC:

- **Published:** in HCI, VR, Web graphics, Education, and HPC/AI: (h-index = 28, i10-index = 53, cited by 2,680+); *IEEE Computer Graphics & Applications* Editor: @theSource Department, Web3D Special Issue (2026)
- **Mentor:** 41 graduate committees, Chairing 3 PhDs and 6 Masters degrees in CS; scores of undergraduates in wage and research credits; instructor of record for 12 semesters of 8 different CS classes (graduate and undergraduate)
- **Innovator:** Designed the world-class Immersa Deck; Volume rendering methods, remote rendering methods; Senior Advisor to NIH and DoD projects still online and running
- **Collaborative:** PI/Co-PI > \$17M creating and enabling new science, education, and outreach with Web3D graphics across disciplines, domains, and audiences
- **Leader:** ARC, International Standards community for 3D Web graphics (Web3D, W3C, Metaverse Standards Forum Chair, ACM SIGGRAPH). General Chair, 30th Annual ACM Web3D Conference.

2. Research, Scholarship & Creative Activity

2.1 Peer-Reviewed Publications

- Nicholas F. Polys, Ayat Mohammed, Ben Sandbrook; Scaling to Perception: Challenges and Opportunities for Large-Scale Immersive Visualization Facilities. *PRESENCE: Virtual and Augmented Reality* 2025; 34 97–117. doi: https://doi.org/10.1162/pres_a_00442
- N.F. Polys, A. Mohammed, A. Johnson and N. Roofigari-Esfahan, "The Value of Immersion in Co-Present, Collaborative Safety Review," *2025 IEEE Conference on Virtual Reality and 3D User Interfaces Workshop (VRW)*, Saint Malo, France, 2025, pp. 1697-1701, <https://doi.org/10.1109/VRW66409.2025.11045961> .
- Nikhil Narra, Anuj Marisetty, Nicholas Polys, and Ben Sandbrook. 2025. "A Generalized Web3D API for Metaverse Bookmarks". In *Proceedings of the 30th International Conference on 3D Web Technology (Web3D '25)*. Association for Computing Machinery, New York, NY, USA, 1–8. <https://doi.org/10.1145/3746237.3746311>
- Nikhil Narra, Anuj Marisetty, Nicholas Polys, and Ben Sandbrook. 2025. "X3Test: A Headless Browser-Based Framework for Automated Performance Benchmarking of X3D/X3DOM Scenes". In *Proceedings of the 30th International Conference on 3D Web Technology (Web3D '25)*. Association for Computing Machinery, New York, NY, USA, 1–5. <https://doi.org/10.1145/3746237.3746315>

Metaverse Standards Forum Blogs:

- [Linked Spatial Experiences: The Web of Worlds](#) - Metaverse Standards Forum
- [Building The World Wide Webiverse](#) - Metaverse Standards Forum

2.2 Grants

- **Completed:** NSF CASERM Sponsored Project on Visual Analytics of High-Dimensional Geophysics data (\$65k)
- **Completed:** ICAT GRANT: Risk perception case study Roanoke, VA . \$25k with Jaeyoung Ha, David Sample, and Terry Clements “Immersive virtual environment designed for flood risk communication” w City of Roanoke
- **Ongoing:** NSF CASERM Co-PI (\$750K phase 2= 5 years IUCRC)
- **Kick Off:** CAIA Grant: Advancing aquaponics workforce development through sociotechnical games; \$25k (2025) with Natasha Bell, Jen Engelke; 40%
- **Kick Off:** new grant: NSF Grant w ECE: Award Number (FAIN): 2417446 ‘Visualization-enhanced Undergraduate Wireless Engineering Education through Problem- and Project-based Learning Approaches’ ; \$399,884 . Harpreet S Dhillon, Nicholas F Polys, Carl B Dietrich, Nicole Pitterson.

2.3 Presentations

- Web3D 2025 (30th ACM SIGGRAPH): papers, tutorials, workshops, and contest wins! [Virginia Tech Advanced Research Computing Opens New Dimensions on the Web](#) | Advanced Research Computing | Virginia Tech
- IAWA 40x40 @ Venice Biennale (Exhibit in European Commission’s Palazzo Bembo (March-Nov): [From Blacksburg to Venice: International Archive of Women in Architecture celebrates 40 years of global impact](#) | Virginia Tech News | Virginia Tech
- IEEE VR 2025 Immersive Visualization Labs workshop paper: [ARC's Visualization team contributes to the 2025 IEEE Conference on Virtual Reality and 3D User Interfaces](#) | Advanced Research Computing | Virginia Tech
- VT Architecture Symposium - “IAWA 40x40” (Immersa Deck, CUBE)
- 2025 Digital Heritage Congress (Siena) - “Web3D Publishing” Tutorial
- [CAAV Con 2025](#) (Baltimore) - “The Virginia Tech Immersa Deck”
- Destination Area 2.0: Living Learning Labs: StreamLab immersive showcase video Rendered for Moss Cube exhibition

3. Teaching & Mentoring

3.1 Capstone Team Mentor

- ECE (Spring, Fall 2025)
- CS (2 teams Fall 2025)
- CDMA (1 team Spring 2026)

3.2 Advising & Supervision

- 2 CS MS Eng on Wage (graduated)
- Mentored ARC Summer Intern on NSF CASERM Grant: Scientific Visualization
- 1 CS PhD pending (2026)
- 1 AOE Masters pending (2026)
- 1 ECE Masters pending (2026)

4. Service

4.1 Departmental

- Supported Prof Pollyea in research and sponsor tours (funded). Faculty News Story : [Underground carbon storage project takes root](#) | Virginia Tech News | Virginia Tech
- Construction Safety VR experiment hosted in The Visionarium (Nazila et al -Class of 65 undergraduates per semester) : [Virtual reality simulates construction hazards for students](#) | Virginia Tech News | Virginia Tech

4.2 University

Supported Faculty projects and publications across Colleges and Institutes at a level of Global Distinction:

- New Immersa Deck (VT-CAVE 5.0) procured and online, supported by ARC A/P Faculty
- Destination Areas 2.0 team member: “Living Learning Landscapes”
- ICAT + ARIES + Building and Construction + ARC: safety assessment lab experience for 125 undergraduates (published)
- AOE Flight dynamics: design and flight simulator project (4 AOE students)
- ME: Bat flight visualization (1 ME student)
- BSE: StreamLab Showcase (2 SoVA students)
- BSE / STS: Aquaponics simulator (2 CS students)
- ECE / VT Wireless : Senior Capstone on antenna pattern measurement (5 ECE students)
- CS Capstone (2 groups of 5): Web Visualization
- Landscape Architecture: Roanoke Flooding Simulations (2 Landscape Architecture MS)
- Supported VT Library’s Insect Collection in 3D: pipeline and publication as Web3D

4.3 Professional

- General Chair for [30th Annual ACM SIGGRAPH Web3D Conference](#).
- Department Editor for IEEE Computers and Graphics Applications (CG&A): @theSource (since 2024)
- Special Issue Editor for IEEE Computers and Graphics Applications (CG&A): Web3D Technologies (2026)

4.4 Community

- President (elected): [The Web3D Consortium](#) (web3d.org)
- Chair: 3D Web Interoperability Working Group, [The Metaverse Standards Forum](#)

- Working Group Co-Chair: Web3D - X3D Specification, Medical, User Experience

5. Awards & Honors

- Web3D 2025 Tools Competition **Winners** (w CS MEng students):
 - Grand Prize: X3D: photo and video spheres with WebXR, Authors - Nicholas Polys, Ben Sandbrook, Ayat Mohammed.
 - 1st Place: X3DOM Reverse-TURNABLE Navigation mod, Authors - Nicholas Polys.
 - 2nd Place: DNA base pairs as X3D LODs, Authors - Nicholas Polys.
 - 3rd Place: X3Test: A Headless Browser-Based Framework for Automated Performance Benchmarking of X3D/X3DOM Scenes, Authors - Nicholas Polys, Anuj Marisetty, Nikhil Narra, Ben Sandbrook.

6. Professional Development

- Certified in Responsible Conduct of Research (Federal)
- VT IRB Investigator (renewed)

7. Future Plans

Pending Proposals:

- Co-PI : NASA Proposal - “Certification-Driven Aircraft Design Under Uncertainty” Sarojini et al 3 years for \$ 6.5 million.
- Senior Personnel: NSF Proposal - “AI for Resilient and Sustainable Cyber-Operational Water Systems (aiWATERS)” Sinha et al. 5 years for \$26,588,927
- ICAT: Building a Sustainable Forest Botanicals Industry in the Eastern United States: Developing and Disseminating PlantShoe 2.0 FY 2027 \$25,000 with Shannon Bell, John Munsell, Scott McCrickard
- ISCE: Garden of Eternity: AI-Assisted Multisensory Interpretation of Cultural and Ecological Landscapes FY 2027 \$25,000 with Eiman Elgewely and Mohammed Seyam
- Advancing Nuclear Science and Workforce in the USA, Congressional Appropriation: \$ 2 million with Ali Haghghat and Jonathan Lewis

Publications (Pending and Planned)

- Interactive simulations to support student intuition in radio frequency and wireless communications concepts. JG Andrew, N Pitterson, CB Dietrich, TJ Talty, NF Polys, B Dahl, ASEE proceedings 2026
- [Web of Worlds](#) Whitepaper forthcoming - Metaverse Standards Forum, Web3D, W3C
- 3-4 Application papers, 1 fundamental (spatial perception), 1 systems (Immersa Deck)