Alexander Sivitilli

Immersive Data Visualization Developer & Postdoctoral Researcher

+ CONTACT

Current Address	College Hill, Armagh, BT61 9DB, United Kingdom
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+ EXPERIENCE

Leverhulme Postdoctoral Research Associate
ARMAGH OBSERVATORY & PLANETARIUM
Armagh, UK
2025 - Present

AOP Small Bodies Group w/ Dr. Apostolos Christou

- Developing, optimising and validating advanced Artificial Neural Networks aimed to identify groups ("families") of asteroids
- Exploring immersive data visualisation protocols to interrogate real and synthetic training data for ANN models
- Coordinating development work on the iDaVIE project
- Contributing to particle rendering and interaction capabilities of iDaVIE
- Organizing weekly astronomy seminars by inviting speakers, scheduling talks, and coordinating logistics

Postdoctoral Research Fellow
INTER-UNIVERSITY INSTITUTE FOR DATA INTENSIVE ASTRONOMY
Cape Town, ZA
2022 - 2024

MEGA-HI Group w/ Prof DJ Pisano & UCT/IDIA Visualisation Laboratory w/ Prof. Russ Taylor

- Leading development work for the iDaVIE VR software suite
- Working with astronomers to produce and document scientific use-cases of the UCT/IDIA VisLab and iDaVIE software suite
- Development work for the CARTA (Cube Analysis and Rendering Tool for Astronomy) visualization and analysis project
- Liaising with the Iziko Planetarium & Digital Dome as part of the Data-to-Dome Project

Data Visualization Developer
UNIVERSITY OF CAPE TOWN
Cape Town, ZA
2018 - 2022

UCT/IDIA Visualization Laboratory w/ Prof. Thomas Jarrett (part-time)

- Developing and testing immersive hardware and software solutions for interactive visualisation of large astronomical data sets
- Designing and maintaining components for the immersive Data Visualisation Interactive Explorer for volumetric rendering (iDaVIE-v) software

STEM Educator
BRAINBOOST EDUCATION
Vancouver, CA
2016 - 2017

STEM Education Group w/ Kerstin Stuerzbecher

- Working with students of primary & secondary education in one-on-one settings
- Creating/preparing materials to make curricula interesting and engaging
- Managing learning needs for individual students to accomplish their goals

Research Assistant
MAX PLANCK INSTITUTE FOR ASTRONOMY
Heidelberg, DE
2015 - 2016

ARGOS Ground-Layer Adaptive Optics Group w/ Wolfgang Gässler

- Designing, building, and programming Laser Alignment Telescope (LAT)
- Traveling to Large Binocular Telescope Observatory in Arizona for LAT installation and commissioning
- Designing and programming the Smart Laser Alignment (SLA) algorithm to automatically align ARGOS laser guide stars using LAT images

Research Assistant — *Trapped Ion Quantum Computing Group w/ Prof. Boris Blinov*

UNIVERSITY OF WASHINGTON
Seattle, USA
2012 - 2013

- Building and testing low-power amplifier to drive piezoelectric optical scanning cavity
- Machining and testing optical cavity as frequency discriminator for ionizing laser followed by implementing Pound–Drever–Hall technique to lock ionizing lasers
- Troubleshooting and repairing power supply unit for barium oven

+ EDUCATION

2018 - 2023 — ***DOCTOR OF PHILOSOPHY***

ASTRONOMY

Thesis Title: Characterizing the Digital Planetarium as a Teaching and Learning Space

University of Cape Town

Cape Town, South Africa

2014 – 2016 — ***MASTER OF SCIENCE***

PHYSICS

Thesis Title: Design and Implementation of a Laser Alignment Telescope for the Advanced Rayleigh guided Ground layer adaptive Optics System on the Large Binocular Telescope

Honors: 1,3 “sehr gut” / very good

Ruprecht-Karls-Universität Heidelberg

Heidelberg, Germany

2008 – 2013 — ***BACHELOR OF SCIENCE (CUM LAUDE)***

COMPUTATIONAL MATHEMATICS & COMPREHENSIVE PHYSICS

MINOR IN APPLIED MATHEMATICS

Honors: Phi Beta Kappa, Sigma Pi Sigma, Top 10%

University of Washington

Seattle, WA, USA

+ TECHNICAL SKILLS

Immersive Visualization and XR	**Unity • Unreal Engine • OpenXR • VR interaction systems • Collaborative immersive environments • Digital dome visualization workflows**
Scientific Visualization and Spatial Data Systems	**OpenSpace • WorldWide Telescope • Uniview (ZEISS) • iDaVIE • CARTA • DS9 • Volumetric rendering • Multidimensional data visualization • Geospatial and astronomical datasets**
Programming and Development	**Python • C/C++ • C# • Java • HLSL/Cg shaders • Git • Scientific prototyping and visualization pipelines**
Scientific Computing and Analysis	**NumPy • Jupyter • MATLAB • Mathematica • R • GIS • NVivo • Data analysis and visualization workflows**
3D Content and Media Tools	**Blender • FreeCAD • GIMP • Final Cut Pro • Scientific media and immersive content production**
General Tools	**Linux • macOS • Windows • LaTeX • MS Office / LibreOffice**

+ LANGUAGES & WORK ELIGIBILITY

Languages	**- English (mother tongue)** **- German (CEFR Level B2, working proficiency both written and spoken)** **- Afrikaans (elementary proficiency)**
Nationality	**- USA** **- Germany**
Current Work Eligibility	**- USA** **- European Union** **- United Kingdom**

+ SELECTED PUBLICATIONS

- **Sivitilli, A.**, Marchetti, L., Comrie, A., Pretorius, P. C., van der Hulst, T. J. M., Vitello, F., Pisano, D. J., Becciani, U., Taylor, A. R., Serra, P., Steyn, M., & van Zyl, M. (2026). iDaVIE v1.0: A virtual reality tool for interactive analysis of astronomical data cubes. *Astronomy and Computing, 56*, 101109. https://doi.org/10.1016/j.ascom.2026.101109
- **Sivitilli, A.**, & Allie, S. (2023). Investigating how students engage with a digital planetarium. *Physics Education Research Conference 2023*.
- Jarrett, T. H., Comrie, A., Marchetti, L., **Sivitilli, A.**, Macfarlane, S., Vitello, F., Becciani, U., Taylor, A. R., van der Hulst, J. M., Serra, P., & Katz, N. (2021). Exploring and interrogating astrophysical data in virtual reality. *Astronomy and Computing, 37*, 100502.
- **Sivitilli, A.**, Comrie, A., Marchetti, L., & Jarrett, T. H. (2020). Virtual reality and immersive collaborative environments: The new frontier for big data visualisation. *Astronomical Data Analysis Software and Systems XXIX, 527*, 221.