Steven Dillmann

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EDUCATION

Stanford University — Sep 2024 – Present
PhD Computational & Applied Mathematics (ICME) — Stanford, CA, USA
- **Research Focus:** AI for Science (Scientific Foundation Models, Agents for Scientific Discovery, LLM Evaluation on Scientific Tasks)

University of Cambridge, St John's College — Oct 2023 – Jul 2024
MPhil Data Intensive Science — Cambridge, UK
- **Overall Grade:** Distinction (87.7%) | Graduated 1st out of 62 students (Valedictorian)
- **Thesis:** Best Thesis (97%) | Deep Learning for the Prompt Detection of Gravitational Wave Signals (Advisors: P. Canizares, M. Agathos)

Imperial College London — Oct 2018 – Sep 2023
MEng Aeronautics with Spacecraft Engineering — London, UK
- **Grade:** First Class Honours (83.2%)| Graduated 1st out of 130 students (Valedictorian), Dean's List (2020–2023)
- **Thesis:** Best Thesis (90%) | Representation Learning for the Discovery of Astrophysical X-ray Transients (Advisor: Rafael Martinez-Galarza)

EXPERIENCE

Harvard-Smithsonian Center for Astrophysics, AstroAI, Harvard University — Jan 2023 – Jun 2023
Predoctoral Fellow (Machine Learning, Astronomy) — Cambridge, MA, USA
- Developed a novel representation learning method to produce a low-dimensional, informative embedding for X-ray source observations, where temporally and spectrally similar objects form distinct clusters, facilitating diverse downstream applications
- Used the pipeline for anomaly detection and X-ray transient searches, resulting in a public catalog of new X-ray transient candidates
- Discovered a new fast X-ray transient potentially associated with a rare giant magnetar flare behind the Large Magellanic Cloud

NASA Jet Propulsion Laboratory, Machine Learning Group, California Institute of Technology — Jun 2022 – Oct 2022
Machine Learning Intern — Pasadena, CA, USA
- Developed an unsupervised clustering method to aggregate crowdsourced data in the Cloudspotting on Mars citizen science project
- Enabled the analysis of Martian cloud populations to answer various scientific questions about the Martian climate and atmosphere

Bundestag (German Parliament), Dr. Stephan Seiter (FDP), Office of Technology Assessment — May 2022 – Jun 2022
Parliamentary Intern — Berlin, Germany
- Developed a framework to analyze the opportunities and risks of emerging technologies like AI, addressing societal, economic, ethical, and legal aspects, highlighting key considerations for policymakers to consider in decision making process
- Prepared briefings on research, technology and education topics for radio discussions, interviews and parliamentary meetings

Amazon — Jan 2022 – May 2022
Business Intelligence Intern — Luxembourg City, Luxembourg
- Analyzed Amazon's transportation forecast data in Europe (focus on the impact of Brexit), and built ETL data integration processes with SQL
- Developed forecast health check tools and interactive live dashboards with Python and HTML for the identification of forecast anomalies

Airbus Defence and Space — Oct 2021 – Jan 2022
Technical Program Management Intern — Friedrichshafen, Germany
- Developed conceptual cloud and AI solutions for data centers and autonomous assets in the Airbus Multi-Domain Combat Cloud
- Examined and identified potential AI opportunities for information and decision superiority use cases, and evaluated their associated risks

European Space Agency (ESA) — Jul 2021 – Oct 2021
Summer Research Intern — Nordwijk, Netherlands
- Built classification workflows in the Asteroid Hunter citizen science project to study the impact of satellite trails on Hubble astronomy
- Developed an image classifier model based on the InceptionV3 model and trained it with the crowdsourced data to classify Hubble images

German Aerospace Center (DLR) — Jul 2020 – Oct 2020
Research and Development Intern — Brunswick, Germany
- Designed an in-flight zero-gravity experiment for deployable space structures run onboard a zero-gravity aircraft by NASA and DLR
- Programmed a motor control and force measurement user interface tool with LabVIEW and integrated actuators and sensors

BMW Group — Jul 2019 – Sep 2019
Data Science Intern — Munich, Germany
- Developed data pipelines for downstream data science applications, and ensured data integrity of large datasets with PySpark
- Performed statistical analyses to automatically identify data anomalies and outliers, and created data visualizations for internal dashboards

SELECTED AWARDS

Stanford VPGE EDGE Fellowship	Doctoral student with the potential to contribute to the diversity of their academic field and degree	2024
Head of Department Award	Graduating student of greatest overall merit in Aeronautical Engineering at Imperial College London	2023
Best Computational Thesis Award	Student of greatest merit in a computational Master's thesis in the Department of Aeronautics at Imperial College London (Representation Learning for the Discovery of Astrophysical X-ray Transients)	2023
Turing Scheme Award	Master's thesis abroad and visiting research at Harvard University, funded by the UK government	2023
Engineers in Business Fellowship	First prize (£1000) for the healthy food business idea "OATOMAT" at the Imperial Business School	2023
Engineering Leaders Scholarship	Most prestigious UK engineering undergraduate scholarship for students who display the potential to become leaders and innovators in STEM, awarded by the Royal Academy of Engineering	2022

+ Stanford ICME Fellowship (2024), Silver & Bronze Excellence Awards in Aeronautics (2020, 2021), Aeronautics Scholar (2020), Ferry Porsche Preis (2017)

PUBLICATIONS

1. Yanke Song, Ashley Villar, Rafael Martinez-Galarza, **Steven Dillmann**, and Vinay Kashyap. A Poisson-process AutoDecoder for Astrophysical, Time-variable, X-ray Sources. Submitted to *The Astrophysical Journal*, also highlighted at the *NeurIPS 2024 Workshop on Machine Learning and the Physical Sciences*, 2024
2. **Steven Dillmann**, Rafael Martinez-Galarza, Roberto Soria, Rosanne Di Stefano, and Vinay Kashyap. Representation Learning for Time-Domain High-Energy Astrophysics: Discovery of Extragalactic Fast X-ray Transient XRT 200515. Under Revision at *MNRAS*, 2024 **[arXiv][Code]**
3. Marek Slipski, Armin Kleinböhl, **Steven Dillmann**, David M Kass, Jason Reimuller, Mark Wronkiewicz, and Gary Doran. The Cloudspotting on Mars citizen science project: Seasonal and spatial cloud distributions observed by the Mars Climate Sounder. *Icarus*, 2023 **[Paper]**
4. Sandor Kruk, Pablo García-Martín, Marcel Popescu, Ben Aussel, **Steven Dillmann**, Megan Perks, Tamina Lund, Bruno Merín, Ross Thomson, Samet Karadag, and Mark J. McCaughrean. The impact of satellite trails on Hubble Space Telescope observations. *Nature Astronomy*, 2023 **[Paper]**

ORAL PRESENTATIONS

1. **Steven Dillmann (Presenter)**, Rafael Martinez Galarza, Roberto Soria, Rosanne Di Stefano, and Vinay Kashyap. Representation Learning for the Discovery of Fast X-ray Transients. In *245th American Astronomical Society Meeting*. American Astronomical Society, January 2025. National Harbor, Maryland, USA
2. **Steven Dillmann (Presenter)**, Rafael Martinez-Galarza, Vinay Kashyap, and Rosanne Di Stefano. Representation Learning for Anomaly Detection in High-Energy Time-Domain Astronomy. In *IAIFI Summer School*. AI Institute for Artificial Intelligence and Fundamental Interactions, Massachusettes Institute of Technology, August 2024. Boston, MA, USA
3. Rafael Martinez-Galarza, **Steven Dillmann**, Cecilia Garafo, Steiner James, Floor Broakgaarden, Joshua Wing, Carol Cuesta Lazaro, Kari Haworth, Douglas Finkbeiner, and Ashley Villar. AstroAI: A New Initiative for Artificial Intelligence in Astrophysics. In *IAIFI Summer Workshop*. AI Institute for Artificial Intelligence and Fundamental Interactions, August 2023. Boston, MA, USA
4. Ravjit Kaur, Rosanne Di Stefano, Vinay Kashyap, Jonathan McDowell, **Steven Dillmann**, Mihir Patankar, Rutuparna Das, and Darin Ragozzine. Intriguing eclipses and time variability in 47 Tucanae's quiescent low-mass X-ray binary X5. In *American Astronomical Society Meeting Abstracts*. American Astronomical Society, February 2024. New Orleans, Louisiana, USA **[Abstract]**
5. **Steven Dillmann (Presenter)**, Rafael Martinez-Galarza, Vinay Kashyap, and Rosanne Di Stefano. Representation Learning Techniques for the Discovery of X-ray Transients. In *AstroAI Meeting*. Harvard-Smithsonian Center for Astrophysics, July 2023. Cambridge, MA, USA
6. Rafael Martinez-Galarza, **Steven Dillmann**, Vinay Kashyap, and Rosanne Di Stefano. New avenues for multi-messenger discoveries in high energy astrophysics. In *The X-ray Universe 2023*. ESA/XMM-Newton Science Operations Centre, June 2023. Athens, Greece
7. Marek Slipski, **Steven Dillmann**, Armin Kleinboehl, Jason D Reimuller, Mark Wronkiewicz, and Gary B Doran. NASA Citizen Science: Cloudspotting on Mars. In *C*Sci 2023*. Citizen Science Association, March 2023. Phoenix, AZ, USA
8. Rosanne Di Stefano, Roberto Soria, Vinay Kashyap, Ryan Urquhart, Caleb Painter, Rafael Martinez-Galarza, Sammarth Kumar, Jack Steiner, Ieva Jankute, Edgar Onate, Cecilia Garraffo, Zekai Zhang, and **Steven Dillmann**. Adventures in Planet Discovery in X-Ray Binaries. In *20th AAS High Energy Astrophysics Division Meeting*. American Astronomical Society, March 2023. Waikoloa, Hawaii, USA **[Abstract]**
9. **Steven Dillmann (Presenter)**, Marek Slipski, and Armin Kleinboehl. Cloudspotting on Mars with Citizen Science and Machine Learning. In *Cloudspotting on Mars: Citizen Science Webinar*. NASA Jet Propulsion Laboratory, November 2022. Pasadena, CA, USA
10. Marek Slipski, Armin Kleinboehl, **Steven Dillmann**, Jason D Reimuller, Mark Wronkiewicz, and Gary B Doran. Cloudspotting on Mars: Mapping mesospheric clouds through citizen science. In *AGU Fall Meeting 2022*. American Geophysical Union, December 2022. Chicago, IL, USA **[Abstract]**
11. **Steven Dillmann (Presenter)**, Sandor Kruk, Ben Aussel, Megan Perks, and Mark J. McCaughrean. Impact of Satellite Constellations on Hubble with Citizen Science and Machine Learning. In *National Astronomy Meeting 2022*. Royal Astronomical Society, July 2022. Warwick, UK

POSTER PRESENTATIONS

1. **Steven Dillmann**, Rafael Martinez-Galarza, Roberto Soria, Vinay Kashyap, and Rosanne Di Stefano. A Representation Learning for Anomaly Detection in High-Energy Astrophysics. In *ICME's 20th Anniversary Research Symposium*. Stanford Institute for Computational and Mathematical Engineering, November 2024. Stanford, CA, USA **[Poster]**
2. **Steven Dillmann**, Rafael Martinez-Galarza, Roberto Soria, Vinay Kashyap, and Rosanne Di Stefano. Representation Learning for the Discovery of High-Energy Transients. In *Bridging the Farm: AI for Science at Stanford University and SLAC*. Stanford Institute for Human-Centered Artificial Intelligence (HAI), October 2024. Stanford, CA, USA
3. **Steven Dillmann**, Rafael Martinez-Galarza, Vinay Kashyap, and Rosanne Di Stefano. Representation Learning and Anomaly Detection for High-Energy Time-Domain Astronomy. In *IAIFI Summer Workshop*. AI Institute for Artificial Intelligence and Fundamental Interactions, Massachusettes Institute of Technology, August 2024. Boston, MA, USA **[Abstract]**
4. Yanke Song, Rafael Martinez-Galarza, Ashley Villar, **Steven Dillmann**, and Vinay Kashyap. A Poisson-process AutoDecoder for Astrophysical, Time-variable, X-ray Sources. In *IAIFI Summer Workshop*. AI Institute for Artificial Intelligence and Fundamental Interactions, Massachusettes Institute of Technology, August 2024. Boston, MA, USA **[Abstract]**
5. **Steven Dillmann**, Rafael Martinez-Galarza, Roberto Soria, Vinay Kashyap, and Rosanne Di Stefano. Data-Driven Discovery: Machine Learning for the Detection and Characterization of X-ray Transients. In *ML-IAP/CCA-2023: Machine Learning in astronomical surveys*. The Flatiron Institute and IAP, November 2023. Paris, France **[Abstract]**
6. **Steven Dillmann**, Rafael Martinez-Galarza, Vinay Kashyap, and Rosanne Di Stefano. Machine Learning for the Detection of X-ray Transients. In *IAIFI Summer Workshop*. AI Institute for Artificial Intelligence and Fundamental Interactions, August 2023. Boston, MA, USA
7. **Steven Dillmann**, Marek Slipski, Armin Kleinboehl, Jason D Reimuller, Mark Wronkiewicz, and Gary B Doran. NASA Citizen Science Cloudspotting on Mars: Aggregating Crowdsourced Data with Unsupervised Machine Learning. In *C*Sci 2023*. Citizen Science Association, March 2023. Phoenix, AZ, USA