# Erin McGowan

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## Education

**New York University** — New York City
*Ph.D. Computer Science, GPA 3.89/4.0* — *Sept 2022 – Present*

**Rutgers University** — New Brunswick
*B. A. Mathematics, GPA 3.79/4.0* — *Sept 2018 – May 2022*

## Publications (*Denotes Joint First Authors)

- **McGowan, E.**, Brewer, E., Silva, C. (2024). ARPOV: Expanding Visualization of Object Detection in AR with Panoramic Mosaic Stitching. ***SIBGRAPI 2024, Best Paper Honorable Mention.*** [PDF]
- Castelo, S., Rulff, J., Solunke, P., **McGowan, E.**,..., Silva, C. (2024). HuBar: A Visual Analytics Tool to Explore Human Behaviour based on fNIRS in AR guidance systems. ***IEEE VIS 2024.*** [PDF]
- **McGowan, E.**, Rulff, J.,..., Silva, C. (2024). Design and Implementation of the Transparent, Interpretable, and Multimodal (TIM) AR Personal Assistant. *In Submission.* [PDF]
- Castelo, S., Rulff, J., Felix, F., **McGowan, E.**,..., Silva, C. (2024). EmbedAR: Interactive Exploration of Action Recognition Models to Support Augmented Reality Guidance Systems. *In Submission.* [PDF]
- Wu, G., Rulff, J., Qian, J., Castelo, S., He, J., **McGowan, E.**,..., Silva, C. (2024). VisuARchive: A Visual Analytics Tool for Documenting and Analyzing AR Task Recordings. *In Submission.* [PDF]
- **McGowan, E.***, Castelo, S.*, Rulff, J.*,..., Silva, C. (2023). ARGUS: Assistive visualization of human-AI collaboration for task guidance in augmented reality. ***IEEE VIS 2023, Best Paper Honorable Mention.*** [PDF]
- **McGowan, E.**, Sanjak J., Mathé E., Zhu Q. (2023). Integrative Rare Disease Biomedical Profile-based Network Supporting Drug Repurposing, A Case Study of Glioblastoma. Orphanet J Rare Dis 18, 301. [PDF]
- **McGowan, E.**, Gawade, V., Guo, W. (2022). A Physics-Informed Convolutional Neural Network with Custom Loss Functions for Porosity Prediction in Laser Metal Deposition. Sensors, 22(2). [PDF]

## Research

**Perceptually-enabled Task Guidance** — Sept 2022 – Present
*with Dr. Claudio Silva* — *VIDA Center, New York University*

- Collaborates with a team to develop visual analytics (VA) tools for scene, behavior, and model analysis in the context of creating an augmented reality (AR) assistant, including
  - *ARGUS*, a VA system for analyzing multimodal sensor data and ML model outputs
  - *ARPOV*, a VA tool for creating and analyzing panoramic mosaic-based visualizations of object detection model outputs tailored to AR applications
  - *HuBar*, a VA tool for exploring human behavior based on fNIRS in AR guidance systems
  - *EmbedAR*, a VA tool for interpreting action recognition model behavior by analyzing feature embeddings and connecting them to physical actions in the AR scene

**Network Analysis for Drug Repurposing** — June 2022 – Sept 2022
*with Dr. Qian Zhu* — *National Center for Advancing Translational Sciences*

- Extracted and cleaned data relevant to glioblastoma from the NCATS Genetic and Rare Diseases Knowledge Graph database to construct a graph network using Neo4j, Cypher, and Python

- Performed network analysis using Gephi, identifying 4 promising candidates for drug repurposing to treat glioblastoma and prompting two follow-up validation studies
- Presented findings at the National Institutes of Health (NIH) and National Center for Advancing Translational Sciences (NCATS) summer poster days

**Artificial Social Intelligence for Successful Teams** Feb 2021 – May 2022
*with Dr. Patrick Shafto* *CoDaS Lab, Rutgers University-Newark*

- Collaborated with a team to develop a platform for conducting Theory of Mind (ToM) experiments via single and multiplayer games using Python, Pandas, JavaScript, Heroku, Firebase, Redis, Socket.IO, FastAPI, and Git as part of the DARPA ASIST project

**Physics-Informed Convolutional Neural Networks** May 2021 – Jan 2022
*with Dr. Weihong 'Grace' Guo* *DIMACS Center, Rutgers University*

- Created a physics-driven convolutional neural network that predicts the porosity (a defect) of objects created via laser metal deposition (3D-printed metals) using Python, Keras, Scikit-learn, NumPy, Pandas, MATLAB, and Google Colab during the 2021 DIMACS REU Program
- Investigated the impact of incorporating physics-informed constraints into the CNN architecture itself via custom loss functions
- Presented findings to REU administration, faculty mentors, and peers

## Selected Projects

**DatasetsSummarizer** May 2023

- Developed an interactive visualization dashboard which describes and compares features of a large number of datasets in a single view (compatible with Jupyter Notebooks)
- Presented findings in journal article-style project report and video demo

**PatentLLM** Dec 2022

- Developed a hierarchical transformer model for patent acceptance prediction using pytorch
- Presented findings in journal article-style project report (linked above)

**AIDA** Feb 2022

- Developed an application that creates and suggests AI-generated image descriptions for Twitter users to add to their tweets before posting
- Independently implemented NLP model in Python for image description generation
- Won Best Overall Hack and Best AI Hack at a Rutgers University hackathon (HackHers 2022)

## Selected Work Experience

**Teaching Assistant**
*Information Visualization, NYU Tandon School of Engineering* *Sept 2024 – Present*
*Visualization for Machine Learning, NYU Center for Data Science* *Jan 2024 – May 2024*

- Plans and leads weekly data visualization lab lessons
- Mentors groups of graduate students during 7-week research project
- Addresses student inquiries at weekly office hours

## Selected Leadership & Advocacy

**Out in STEM (oSTEM)**
*President, oSTEM at NYU* *May 2024 – Present*
*Postgraduate Liaison, oSTEM at NYU* *Oct 2022 – May 2024*
*Co-President, oSTEM at Rutgers* *Apr 2020 – May 2022*

- Collaborated with global nonprofit Out in STEM and Center for Social Justice Education and LGBT Communities to plan and host professional and social events for LGBTQ+ STEM students
- Secured and managed thousands of dollars in funding from the student governing body each semester

## Awards and Honors

- **Awards**: NYU Tandon Future Leader Fellowship (most prestigious level of Ph.D. full funding at NYU Tandon, 2022-2024), Rutgers Trustee Scholarship (2018-2022), Henry Rutgers Scholarship (2018-2022), National Merit Scholarship (2018)
- **Honors**: NSF GRFP Honorable Mention (2024), Dean's List (all 8 undergraduate semesters), NJ State Seal of Biliteracy in Latin

## Skills and Qualifications

- **Languages**: Python, JavaScript, C++, Java, SQL, Cypher, MATLAB, HTML/CSS, LaTeX
- **Data Visualization**: D3.js, Vega-Lite, Three.js, WebGL, OpenGL, Gephi, Tableau, NVivo
- **Computer Vision**: OpenCV, PyTorch, Keras, Tensorflow, Scikit-learn, NumPy, Pandas
- **Databases**: MySQL, Apache Spark, Neo4j, Redis
- **Miscellaneous**: Git, Heroku, Firebase, Socket.IO, FastAPI
- CITI certified in Human Research, Social/Behavioral/Epidemiologic Research Investigators