Camelia D. Brumar

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Education

May 2020 - Present: **Ph.D. in Computer Science**, *Tufts University, MA*, Advisor: Prof. Remco Chang.

August 2024: **M.S. in Computer Science**, *Tufts University, MA*, Advisor: Prof. Remco Chang.

May 2020: **B.S. in Mathematics**, *University of Maryland, College Park, MD*, Advisor: Prof. Amitabh Varshney.

Academic Appointments

May 2020 - Present: **Graduate Research Assistant**, *Visual Analytics Lab at Tufts University*, Boston, MA, Supervisor: Prof. Remco Chang.

January 2025 - Present: **Research Affiliate**, *Massachusetts Institute of Technology*, Boston, MA, Mentor: Prof. Arvind Satyanarayan.

May 2024 - Present: **Research Fellow**, *Harvard University*, Boston, MA, Mentor: Prof. Hanspeter Pfister.

October 2019 - May 2020: **Undergraduate Research Assistant in Augmented and Virtual Reality**, *Graphics and Visual Informatics Laboratory at UMD*, College Park, MD, Supervisor: Prof. Amitabh Varshney.

May 2025 - August 2025: **Graduate Teaching Assistant**, *Tufts University*, Medford, MA.

March 2019 - July 2019: **Undergraduate Research Assistant in Numerical Analysis**, *Worcester Polytechnic Institute*, Worcester, MA, Supervisor: Prof. Zhongqiang Zhang.

Professional Appointments

July 2023 - September 2023: **Data Science Contractor**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Michael Fanton.

May 2022 - August 2022: **Ph.D. Research Intern in Visual Analytics & AI**, *Tableau Research/Salesforce*, Seattle, WA, Mentor: Dr. Ana Crisan.

September 2021 - May 2022: **Data Science Contractor**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Kevin E Loewke.

June 2021 - August 2021: **Data Science Intern**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Kevin E Loewke.

March 2020 - May 2020: **UI/UX Intern**, *Hyka Therapeutics*, Cambridge, MA.

May 2019 - August 2019: **Software Engineering Intern**, *Bose Corporation*, Framingham, MA, Supervisor: Matthew Jannace.

Refereed Journal & Conference Publications

2025 **A Typology of Decision-Making Tasks for Visualization**, *IEEE Transactions on Visualization and Computer Graphics*, vol. 31, no. 10, Oct. 2025, pp. 8536-8551, 10.1109/TVCG.2025.3572842, IEEE VIS'25.
Camelia D. Brumar, Sam Molnar, Gabriel Appleby, Kristi Potter, Remco Chang.

2025 **EmbryoProfiler: A Visual Clinical Decision Support System for In vitro Fertilization**, *IEEE Transactions on Visualization and Computer Graphics*, IEEE VIS'25.
Johannes Knittel, Simon Warchol, Jacob Troidl, Camelia D. Brumar, Helen Yu Yang, Eric Mörth, Robert Krüger, Daniel Needleman, Dalit Ben-Yosef, Hanspeter Pfister

2024 **DimBridge: Interactive Explanation of Visual Patterns in Dimensionality Reductions with Predicate Logic**, *IEEE Transactions on Visualization and Computer Graphics*, vol. 31, no. 1, Jan. 2025, pp. 207-217, 10.1109/TVCG.2024.3456391, IEEE VIS'24.
Brian Montabault, Gabriel Appleby, Jen Rogers, Camelia D. Brumar, Mingwei Li, Remco Chang.

2023 **Characterizing the Users, Challenges, and Visualization Needs of Knowledge Graphs in Practice**, *IEEE Transactions on Visualization and Computer Graphics*, vol. 30, no. 1, Jan. 2024, pp. 584-594, doi.org/10.1109/TVCG.2023.3326904, IEEE VIS'23.
Harry Li, Gabriel Appleby, Camelia D. Brumar, Remco Chang, Ashley Suh.

2022 **A Novel Approach for retrospectively Estimating the Efficiency of PGT-A Testing**, *Fertility and Sterility*, vol. 118, no. 4, Oct. 2022, pp. e352, doi.org/10.1016/j.fertnstert.2022.09.159.
Justina Hyunjii Cho, Fernanda Murillo Armijo, Michael Fanton, Camelia D. Brumar, Kathleen Miller, David Hoffman, Kevin E Loewke

2022 **Large-scale simulation of pregnancy rate improvements using an AI model for embryo ranking**, *Human Reproduction*, vol. 37, Jul 2022, pp. 272-273.
JH Cho, A Ehlers, Camelia D. Brumar, P Maeder-York, O Barash, J Malmsten, Z Nikica, D Sakkas, M Levy, K Miller, MD VerMilyea, K Loewke

2022 **P-171 Sensitivity analysis of an embryo grading artificial intelligence model to different focal planes**, *Human Reproduction*, vol. 37, no. 1, Jul. 2022, pp. deac107.166, doi.org/10.1093/humrep/deac107.166.
JH Cho, Camelia D. Brumar, P Maeder-York, O Barash, J Malmsten, N Zaninovic, D Sakkas, K Miller, M Levy, MD VerMilyea, K Loewke.

2022 **P-173 Large-scale simulation of pregnancy rate improvements using an AI model for embryo ranking**, *Human Reproduction*, vol. 37, no. 1, Jul. 2022, pp. deac107.168, doi.org/10.1093/humrep/deac107.168.
JH Cho, A Ehlers, Camelia D. Brumar, P Maeder-York, O Barash, J Malmsten, Z Nikica, D Sakkas, M Levy, K Miller, MD VerMilyea, K Loewke.

2021 **Characterization of an artificial intelligence model for ranking static images of blastocyst stage embryos**, *Fertility and Sterility - ASMR*, vol. 117, no. 3, Mar. 2022, pp. 528-535, 10.1016/j.fertnstert.2021.11.022.
Kevin Loewke, Justina Hyunjii Cho, Camelia D. Brumar, Paxton Maeder-York, Oleksii Barashb, Jonas E. Malmstenc, Nikica Zaninovicc, Denny Sakkasd, Kathleen A. Millere, Michael Levyf, Matthew David VerMilyeag.

2020 **A Log-Rectilinear Transformation for Foveated 360-degree Video Streaming**, *IEEE Transactions on Visualization and Computer Graphics*, vol. 27, no. 5, May 2021, pp. 2638-2647, 10.1109/TVCG.2021.3067762, **Honorable Mention**, IEEE VR'21.
David Li, Ruofei Du, Adharsh Babu, Camelia D. Brumar, Amitabh Varshney.

2019 **Application of Approximate Matrix Multiplication to Neural Networks and Distributed SLAM**, 10.1109/HPEC.2019.8916468, , IEEE HPEC'19.
Brian Plancher, Camelia D. Brumar (Co-first author), Iulian Brumar, Lillian Pentecost, Saketh Rama, David Brooks.

Manuscripts under Review/Pre-prints

2025 **The Influence of Typologies on Visualization Design**.
Camelia D. Brumar, Gabriel Appleby, Sam Molnar, Remco Chang.

2025 **The Five Problem Sheets Methodology for Problem-Driven Design**.
Camelia D. Brumar, Brian Montambault, Suyang Li, Mingwei Li, Remco Chang.

2025 **Beyond Point Solutions: Formalizing Problem and Design Spaces for Visualization**.
Camelia D. Brumar, Gabriel Appleby (co-first author), Ashley Suh, Brian Montabault, Jen Rogers, Remco Chang.

2024 **RekomGNN: Visualizing, Contextualizing and Evaluating Graph Neural Networks Recommendations**, *ArXiv Preprint*, doi.org/10.48550/arXiv.2310.11562.
Camelia D. Brumar, Gabriel Appleby, Teddy Matinde, Lara Thompson, Anamaria Crisan.

2023 **PIXAL: Visualizing Explainable Anomalies through Predicate Induction**, *ArXiv Preprint*, doi.org/10.48550/arXiv.2205.11004.
Brian Montabault, Camelia D. Brumar, Michael Behrisch, Remco Chang.

Presentations, Talks, Tutorials

July 2025 **A Typology of Decision-Making Tasks in Visualization**, *MIT Visualization Group*.

October 2024 **Beyond specific design solutions: The design space - Problem Space Framework and its applications to Decision-Making**, *Doctoral Colloquium, IEEE VIS 2024, Tampa, FL*.

October 2024 **The design space - Problem Space Framework & its applications to Decision-Making**, *Georgia Tech Visual Analytics Lab, Georgia Institute of Technology*.

August 2024 **Chat with your research papers using LLMs**, *Boston VIS PhD Summer School, Northeastern University*.

July 2024 **A Typology of Decision-Making Tasks in Visualization**, *Visual Computing Group, Harvard University*.

Leadership, Outreach & Service

August 2024 - Present **Co-founder and co-organizer**, *Boston VIS+AI Meetup*.

August 2024 - Present **Co-founder and organizer**, *Boston VIS Community*.

April 2022 - Present **Board Member**, *Graduate Student Association at Tufts*, Boston, MA.

October 2025 **Panelist**, *Association of Women in Mathematics at Tufts*, Boston, MA.

October 2024 **Organizer**, *Boston IEEE VIS'24 Satellite Conference*, Boston, MA.

September 2023 **Student Volunteer**, *Dagstuhl Seminar: Human-Centered Approaches for Provenance in Automated Data Science, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Wadern, Germany*.

May 2023 - August 2023 **Co-organizer**, *Data Visualization Summer School*.

August 2021 **Tech and Moderator Student Volunteer**, *IEEE VIS'21 Conference, Remote*.

September 2020 - December 2020 **Member**, *Harvard Innovation Labs*, Allston, MA.

August 2020 **Student Volunteer**, *SIGGRAPH'20 Conference*, Remote.

Students Mentored

2020-2021 **Zeyu (August) Chang**, *Graduate Research Assistant*.

2020-2021 **Binh (Irene) Chang**, *Undergraduate Research Assistant*.

2020-2021 **Anna W. Yuen**, *Undergraduate Research Assistant*.

2020 **Kate Hanson**, *Undergraduate Research Assistant*.

Teaching

Summer 2025 **Graduate teaching assistant**, *CS 11 Intro to Computer Science, Tufts University*.

Spring 2025 **Guest lecturer**, *CS 178 Visual Analytics*, Tufts University.

Spring 2021 **Guest Lecturer**, *COMP 152-02 Visual Analytics, Tufts University*.

Reviewing Activities

Posters **IEEE Visualization Poster Session, 2025**, *Reviewed 5 submissions*.

Workshop **IEEE Visualization for AI Explainability (VISxAI), 2024**, *Reviewed 3 submissions*.

Languages

Romanian (native), Spanish (native), Catalan (native), and English (fluent).