

Camelia D. Brumar

Visual Analytics Lab @ Tufts University
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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

- 05/20 - present **Graduate Research Assistant**, *Visual Analytics Lab at Tufts University*, Boston, MA, Supervisor: Prof. Remco Chang.
- 01/25 - present **Research Affiliate**, *Massachusetts Institute of Technology*, Boston, MA, Mentor: Prof. Arvind Satyanarayan.
- 05/24 - present **Research Fellow**, *Harvard University*, Boston, MA, Mentor: Prof. Hanspeter Pfister.
- 10/19 - 05/20 **Undergraduate Research Assistant in Augmented and Virtual Reality, Graphics and Visual Informatics Laboratory at UMD**, College Park, MD, Supervisor: Prof. Amitabh Varshney.
- 05/25 - 08/25 **Graduate Teaching Assistant**, *Tufts University*, Medford, MA.
- 05/19 - 07/19 **Undergraduate Research Assistant in Numerical Analysis**, *Worcester Polytechnic Institute*, Worcester, MA, Supervisor: Prof. Zhongqiang Zhang.

Professional Appointments

- 07/23 - 09/23 **Data Science Contractor**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Michael Fanton.
- 05/22 - 08/22 **Ph.D. Research Intern in Visual Analytics & AI**, *Tableau Research/Salesforce*, Seattle, WA, Mentor: Dr. Ana Crisan.
- 09/21 - 05/22 **Data Science Contractor**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Kevin E Loewke.
- 06/21 - 08/21 **Data Science Intern**, *Alife Health*, San Francisco, CA, Supervisor: Dr. Kevin E Loewke.
- 03/20 - 05/20 **UI/UX Intern**, *Hyka Therapeutics*, Cambridge, MA.
- 05/19 - 08/19 **Software Engineering Intern**, *Bose Corporation*, Framingham, MA, Supervisor: Matthew Jannace.

Awards and Recognitions

- 2023 **Office of the Provost at Tufts University - Graduate Flights Funding Travel Grant (\$1300)**.
- 2023 **Dagstuhl Seminar Travel Grant (\$640)**.

- 2022 **Conference Session Co-Chair, IEEE VIS'22.**
- 2021 **Best Paper Honorable Mention, IEEE VR'21.**
- 2020 **3rd Place Winner, Major League Hacking, Data Grind Day Hackathon.**
- 2017 **Spanish Ministry of Education Merit Scholarship (\$7000).**
- 2016 **Spanish Ministry of Education Merit Scholarship (\$7000).**

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.
- 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 Barash, Jonas E. Malmsten, Nikica Zaninovic, Denny Sakkas, Kathleen A. Miller, Michael Levy, Matthew David VerMilyea.
- 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.

Posters

- 2022 **P-581 A Novel Approach for retrospectively Estimating the Efficiency of PGT-A Testing, Fertility and Sterility**, ASRM Scientific Congress & Expo, Oct. 2022..
Justina Hyunjii Cho, Fernanda Murillo Armijo, Michael Fanton, Camelia D. Brumar, Kathleen Miller, David Hoffman, Kevin E Loewke
- 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, Alex Ehlers, Camelia D. Brumar, Paxton Maeder-York, Oleksii Barash, Jonas E. Malmsten, Nikica Zaninovic, Denny Sakkas, Michael Levy, Kathleen Miller, Matthew David VerMilyea, Kevin 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.
 Justina Hyunjii Cho, Camelia D. Brumar, Paxton Maeder-York, Oleksii Barash, Jonas E. Malmsten, Nikica Zaninovic, Denny Sakkas, Kathleen Miller, Michael Levy, Matthew David VerMilyea, Kevin 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.
 Justina Hyunjii Cho, Alex Ehlers, Camelia D. Brumar, Paxton Maeder-York, Oleksii Barash, Jonas E. Malmsten, Nikica Zaninovic, Denny Sakkas, Michael Levy, Kathleen Miller, Matthew David VerMilyea, Kevin Loewke.

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

- 08/25 **The Influence of Typologies on Visualization Design**, *Talk*, MIT Visualization Group.
- 07/25 **A Typology of Decision-Making Tasks in Visualization**, *Talk*, MIT Visualization Group.
- 11/24 **A Typology of Decision-Making Tasks in Visualization**, *Talk*, National Renewable Energy Laboratory.
- 10/24 **Beyond specific design solutions: The design space - Problem Space Framework and its applications to Decision-Making**, *Doctoral Colloquium, IEEE VIS 2024, Tampa, FL*.
- 10/24 **The design space - Problem Space Framework & its applications to Decision-Making**, *Georgia Tech Visual Analytics Lab, Georgia Institute of Technology*.
- 08/24 **Chat with your research papers using LLMs**, *Boston VIS PhD Summer School, Northeastern University*.

07/24 **A Typology of Decision-Making Tasks in Visualization**, *Visual Computing Group, Harvard University.*

Leadership, Outreach & Service

- 08/24 - present **Co-founder and co-organizer**, *Boston VIS+AI Meetup*.
- 08/24 - present **Co-founder and organizer**, *Boston VIS Community*.
- 04/22 - present **Board Member**, *Graduate Student Association at Tufts*, Boston, MA.
- 10/25 **Panelist**, *Association of Women in Mathematics at Tufts*, Boston, MA.
- 10/24 **Organizer**, *Boston IEEE VIS'24 Satellite Conference*, Boston, MA.
- 09/23 **Student Volunteer**, *Dagstuhl Seminar: Human-Centred Approaches for Provenance in Automated Data Science*, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Wadern, Germany.
- 05/23 - 08/23 **Co-organizer**, *Data Visualization Summer School*.
- 08/21 **Tech and Moderator Student Volunteer**, *IEEE VIS'21 Conference*, Remote.
- 09/20 - 12/20 **Member**, *Harvard Innovation Labs*, Allston, MA.
- 08/20 **Student Volunteer**, *SIGGRAPH'20 Conference*, Remote.

Students Mentored

- 2020-2021 **Zeyu (August) Chang**, *Graduate Research Assistant*, Now at Alife Health.
- 2020-2021 **Binh (Irene) Chang**, *Undergraduate Research Assistant*, Now at Columbia University.
- 2020-2021 **Anna W. Yuen**, *Undergraduate Research Assistant*, Now at UC Berkeley.
- 2020 **Kate Hanson**, *Undergraduate Research Assistant*, Now at MITRE.

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.