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# Camelia D. Brumar

## Education

05/20 - present **Ph.D. in Computer Science**, *Tufts University, MA*, Advisor: Prof. Remco Chang.

08/24 **M.S. in Computer Science**, *Tufts University, MA*, Advisor: Prof. Remco Chang.

05/20 **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, Advisor: 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

2025 **Office of the Dean of Graduate Education for the School of Engineering | Graduate Student Travel Fund ($600)**.

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

2026 **The Power of Typologies on Visualization Design**, *IEEE VIS'26*, Under Submission.
Camelia D. Brumar, Gabriel Appleby, Sam Molnar, Remco Chang.

2026 **Expanding the Goals of Visual Communication: A Case Study of Nutrition Label Designs**, *IEEE VIS'26*, Under Submission.
Kim Brian Byungmoo, Manling Yang, Noah Gibson, Camelia D. Brumar, Suyang Li, Mingwei Li, Norbert Wilson, Wylin Wilson, Katherine E. Isaacs, Remco Chang.

2026 **Position Paper: The Strategic Opportunity for Visual Analytics in the Age of Generative AI**, *EuroVA Workhop, EuroVis*.
Sjoerd Vink, Byungmoo Kim, Camelia D. Brumar, Manling Yang, Kristi Potter, Remco Chang.

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.

## Work-in-progress Papers/Pre-prints

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

06/26 **From Decisions to Designs: A Hands-On Tutorial with the Typology of Decision-Making Tasks**, *Tutorial*, EuroVIS Conference, Nottingham, UK.

11/25 **A Typology of Decision-Making Tasks in Visualization**, *Presentation*, IEEE VIS, Vienna, Austria.

10/25 **A Typology of Decision-Making Tasks in Visualization and Its Applications in AI and Healthcare**, *Talk*, National Student Data Corps Chapter at Tufts University.

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**, *Presentation*, Georgia Tech Visual Analytics Lab.

08/24 **Chat with your research papers using LLMs**, *Tutorial*, Boston VIS PhD Summer School, Northeastern University.

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

11/25 **Panelist**, *Association of Women in Mathematics at Tufts*, Boston, MA.

10/24 **Organizer**, *MIT + Tufts + University of Arizona Lab Mixer*, Boston, MA.

10/24 **Organizer**, *Boston IEEE VIS'24 Satellite Conference*, Boston, MA.

04/22 - 05/24 **Board Member**, *Graduate Student Association at Tufts*, Boston, MA.

08/23 **Panelist**, *Graduate Student Q&A Orientation Panel*, Medford, MA.

09/23 **Student Volunteer**, *Dagstuhl Seminar: Human-Centered 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*.

08/22 **Panelist**, *Graduate Student Q&A Orientation Panel*, Medford, MA.

09/21 **Panelist**, *PhD Student Q&A Orientation Panel*, Medford, MA.

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

2025 - present **Brian Kim**, *Currently a PhD Student*.

2025 - present **Manling Yang**, *Currently a PhD Student*.

2025 - present **Suyang (Susie) Li**, *Currently a PhD Student*.

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

Conference **ACM CHI - Poster Session**, *2026*.

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| Conference | **PacificVis - Short Paper Track**, *2026*. |
| Journal | **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, *2026*. |
| Conference | **Eurographics Conference on Visualization (EuroVis)**, *2026*. |
| Conference | **IEEE Visualization - Poster Session**, *2025*. |
| Workshop | **IEEE Visualization for AI Explainability (VISxAI)**, *2024*. |