# Anneliese Brei

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## Research Interests

Narrative Understanding, Narrative Intelligence, Text Evaluation, Natural Language Generation, Ethical AI

## Education

**University of North Carolina (UNC) at Chapel Hill**
Ph.D. Candidate in Computer Science — Aug 2022 – Present
M.Sc. in Computer Science — May 2024
Advisor: Prof. Snigdha Chaturvedi

**William & Mary (W&M)** — Aug 2018 – May 2022
BS in Computer Science (with Honors) — Summa Cum Laude 4.0/4.0 GPA
Minor in Creative Writing
Undergraduate Advisor: Prof. Bin Ren

Study Abroad at Christ's College, Cambridge University, UK — July – Aug 2019

## Experience

**Research Assistant**, UNC Chapel Hill — Aug 2022 – Present
Advisor: Prof. Snigdha Chaturvedi

**Computer Science Consultant**, W&M — Aug 2020 – May 2022
Supervisor: Prof. Peter Kemper

**Teaching Assistant**, CSCI 301 Software Development, W&M — Summer 2021
Supervisor: Prof. Peter Kemper

**Marketing Coordinator**, Raymond A. Mason School of Business — Jan 2019 – Jan 2021
Supervisor: Jeffrey Rich

**Intern**, Center for Legal & Court Technology, W&M School of Law — May – Aug 2019
Supervisor: Prof. Fredric Lederer — July – Aug 2018

## Publications

**Conference papers**

*Returning to the Start: Generating Narratives with Related Endpoints*
Anneliese Brei, Chao Zhao, Snigdha Chaturvedi
Proceedings of NAACL 2024. [Paper][Poster][Slides][Code]

**Theses**

*Quantum Federated Learning: Training Hybrid Neural Networks Collaboratively*
Advisor: Prof. Qun Li
Undergraduate Honors Thesis, William & Mary, May 2022 [Paper][Site][Video]

**Books**

Available as paperbacks on Amazon and *Barnes & Noble Online Bookstore*:

- *The von Neumann Boutique*, Kindle Direct Publishing, 2020.
- *The Song of Paquita*, Kindle Direct Publishing, 2017.
- *Clocks Out of Time*, CreateSpace, 2015.
- *She Watches*, CreateSpace, 2014.

**Creative Fiction/Nonfiction & Essays**

- *Wake Up Call*, Non-fiction Winner 2021, $2500 prize, Newton-Blanchard [announcement]
- *The Memory*, Long Story Short Award Fall 2020, Short Fiction, Short Édition [site]
- Essay Finalist, The Fountainhead Essay Contest 2018, $100 prize, The Ayn Rand Institute [announcement]

## Honors

**Fellowships**

- **Graduate Research Fellowship (GRFP),** National Science Foundation five-year fellowship awarded to graduate students, 2023-2027
- **Royster Society PhD Fellowship,** UNC five-year fellowship awarded to one Computer Science student and only ten students across all doctoral programs in the 2022 cohort, 2022-2027
- **Departmental Honors with Honors Fellowship,** W&M undergraduate honorary designation with $4000 grant to conduct research, 2021-2022

**Awards**

- **Young Researcher Attendee & Travel Grant**,11th Heidelberg Laureate Forum, among 200 attendees selected worldwide, 2024
- **Grace Hopper Conference Scholarship**, AnitaB.org, 2023
- **Computing Research Association (CRA-WP) Attendee & Travel Grant**, 2023
- **Stephen K. Park Undergraduate Scholarship Award**, W&M award of $1000 given to top graduating undergraduate computer science student, 2022
- **Dean's List**, all semesters at W&M, 2018-2022
- **Phi Beta Kappa Member**, W&M nomination and induction into Alpha Chapter of Virginia, 2021
- **Rocket Pitch Winner**, Alan B. Miller Entrepreneurship Center, best presentation at weekly Rocket Pitch Competition, awarded $100, selected for final round, 2021
- **James Monroe Scholarship**, W&M, Top academically distinguished undergraduates (5-7% sophomores). Awarded $3000 summer research grant, 2020-2022
- **Alpha Lambda Delta & Phi Eta Sigma**, W&M first-year honor societies, awarded to freshmen with 3.5 or greater GPA, 2019

## Service

**Workshop Organization**

- Workshop Organizer, The Sixth Workshop on Narrative Understanding, EMNLP 2024
- Steering Committee, Global Royster Conference, June 2024
- Steering Committee, Global Royster Conference, May 2023
- Planning Board Member, W&M Cypher VII Hackathon, Mar 2022
- Planning Board Member, W&M Cypher VI Hackathon, Apr 2021

**Reviewer**

- The Fifth Workshop on Narrative Understanding, ACL 2023

## Invited Talks

- *How Can a Researcher Use AI to Better Connect with a Community?,* [Site] **Workshop Talk** at Global Royster Conference, June 2024
- *Detecting the Unreliable Narrator & Other Work with Narratology and AI,* [Site] **Research Presentation** at Global Royster Conference, June 2024
- *'Returning to the Start', Research as a UNC Graduate Student,* **Research Presentation** at UNC Graduate School Advocacy and Development Board Planning Meeting, Apr 2024
- *Jaunting Through a Neural Network***,** [Site], **SciArt Gallery Presentation** at W&M Student Showcase, Apr 2021
- *The von Neumann Boutique: A Published Novel That Introduces Computer Science & Ada Lovelace in a Smart Shop Framework,* [Site], **Research Presentation** at W&M Undergraduate Research Month, Apr 2021

## Research Posters & Visual Abstracts

- *A Tale of a Story Generator: Incorporating Narratology into Natural Language Generation & Analysis*, **Visual Abstract** [Site], Global Royster, May 2023
- *Power & Justice in the Age of Transformers*, **Poster**, Global Royster, May 2023
- *Addressing Narrative Coherence*, **Poster,** CRA-WP 2023 Grad Cohort Workshop, Apr 2023
- *Quantum Federated Learning*: *Training Hybrid Neural Networks Collaboratively,* **Poster & Video Presentation***,* [Site][Video], William & Mary Undergraduate Research Month, Apr 2022
- *The von Neumann Boutique: A Novel That Introduces Computer Science & Ada Lovelace in a Smart Shop Framework*, **Visual Abstract**, [Site], William & Mary Undergraduate Research Month, Apr 2021

## Outreach

- *Computers and Writing with LLMs, NLP Research Demonstration*, Open House for Middle & High School Students & Families, Jan 2023

## Service

- Phi Beta Kappa, Richmond Association (serving the Commonwealth of Virginia)
  Vice President, Mar 2024-Present
- Graduate Student Experience, UNC
  RA STEM Working Group, Jan 2024-present
- Computer Science Student Association, UNC
  Officer, Aug 2023-Present
  Officer, Aug 2022-2023
- Agency 1693, W&M
  Co-President, Chief Strategy Officer, Mar-Oct 2020
  Director of On-Campus Accounts, May 2019-2020
  Member, Sep 2018–May 2019

## University Memberships

- UNC-CH Graduate Women in Computer Science Group, Aug 2022–Present
- W&M Association for Computing Machinery, Jan 2020–May 2022
- W&M Society of Women in Computing, Aug 2021–May 2022

## Sample Research

**Quantum Federated Learning**: *Training Hybrid Neural Networks Collaboratively* May 2021 – May 2022

Advisor: Dr. Qun Li
[Paper][Site]

Undergraduate honors thesis that explores basic concepts of machine learning, neural networks, federated learning, and quantum computing in an effort to better understand Quantum Machine Learning, an emerging field of research. We propose Quantum Federated Learning (QFL), a schema for collaborative distributed learning that maintains privacy and low communication costs. We demonstrate the QFL framework and local and global update algorithms with implementations that utilize TensorFlow Quantum libraries.

**The von Neumann Boutique:** *A Published Novel That Introduces Computer Science & Ada Lovelace in a Smart Shop Framework* May – Aug 2020

Advisor: Dr. Bin Ren
[Book][Site]

Researched connections between historical figure Ada Lovelace and concepts in Computer Science, including parallel processing, von Neumann architecture, black box model, serial computations, bottleneck issue, interconnecting network, data exchange topology, fault tolerance, fault resistance, and redundancy. Conceptualized real-life metaphors to make concepts in Computer Science easier to comprehend. Experimented with story-telling methods by testing different layouts, graphics, and visuals. Produced prototype.

**Exploring Intersections Between Art & Science** Jan – May 2019
(Freshman Honors Research)

Advisor: Dr. Kristin Wustholz

Developed classroom materials for future sessions of freshman seminar class *Light at the Museum* in the Chemistry Department. Performed literature review to analyze the simultaneous development of art and science.

## Sample Projects

**StudyBuddy**, CSCI 425 Entrepreneurship in CS Jan – May 2021
Professor: Peter Kemper, (757) 221-3462

Developed innovative prototype for social networking web platform with match-making algorithm to help students find study partners and create study groups. Competed in multiple tournaments to pitch ideas and convince peer-based audience of project's novelty, value, and feasibility. Initiated process to launch start-up company. Developed marketable minimum viable product. Elected team champion, won 1st Place in community-wide Rocket Pitch Competition, and awarded $100 from Alan B. Miller Entrepreneurship Center.

**Maze Application**, CSCI 301 Software Development July – August 2020
Professor: Peter Kemper, (757) 221-3462

Built Android maze app that allows player to navigate maze from ground-view (e.g. inside the maze). Extended functionality from refactored Paul Falstad (www.falstad.com) implementation. Worked with pre-existing code that generates maze (with choice level of difficulty and optional rooms) using Prim's algorithm or input file in XML format. Implemented maze generation via Kruskal's algorithm. Implemented manual playing mode or optional automatic players using either wall-follower algorithm or a shortest path algorithm. Features during game include dynamic map with optional answer key, compass rose, energy points, and battery. Ported entire code base from Eclipse to Android Studio. Worked with threads to show loading screen with progress bar during maze generation. Added graphics and themes inspired by *Alice in Wonderland* to make product attractive and marketable.