

# Tan Gemicioglu

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## Research Interests

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My research focuses on how we can make healthcare effortless. I design implicit health interventions that demand minimal attention and develop passive sensing technologies that can measure clinically relevant biosignals. By integrating these approaches, I aim to develop closed-loop wearable technology that monitors and modulates our health continuously to unobtrusively maintain well-being.

## Education

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**Cornell University** – New York City, NY Aug 2023 – Present  
Ph.D. in Information Science  
Advisors: Dr. Tanzeem Choudhury & Dr. Cheng Zhang

**Georgia Institute of Technology** – Atlanta, GA Aug 2019 – Dec 2022  
B.S. in Computer Science GPA: 3.89 / 4.0  
Intelligence & People concentration, Minor in Physiology

## Work Experience

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### Research Experience

**Cornell University People-Aware Computing** – Graduate Research Assistant Aug 2023 – Present  
Advisors: Dr. Tanzeem Choudhury, Dr. Cheng Zhang  
Building wearables for passive health interventions to enable attention-free behavior change, neuro-motor rehabilitation, and physiological strain relief. Studying mobile acoustic sensing for everyday monitoring of blood pressure, muscle activity, and respiratory function.

**Georgia Tech Contextual Computing** – Graduate Research Assistant Jan 2023 – Aug 2023  
Advisors: Dr. Thad Starner, Dr. Allison Okamura (Stanford University)  
Led haptics research for skill training and rehabilitation with minimal attention. Partnered with Stanford ME & Neurology to create consumer and clinical haptic gloves, funded by NSF PFI & Convergence.

**Georgia Tech Brain Lab** – Undergraduate Research Assistant May 2021 – May 2023  
Advisors: Dr. Melody Jackson, Dr. Thad Starner  
Developed wearable, non-invasive fNIRS brain-computer interface using body movement. Aided the construction of movement-resistant, robust EEG sensors to allow a wider range of BCI functionality.

**Georgia Tech Contextual Computing** – Undergraduate Research Assistant Jan 2020 – Dec 2022  
Advisors: Dr. Thad Starner  
Conducted research projects on discreet interaction methods and haptic stimulation for learning. Co-ordinated HCI projects and student groups with researchers at University of Tokyo and Google.

### Industry Experience

**Microsoft Research** – Research Intern May 2022 – Aug 2022  
Advisors: Dr. Mike Winters, Dr. Yu-Te Wang  
Built multi-gesture classifier for tongue gesture recognition with 92% accuracy, enabling invisible interactions. Invented new, accessible hands-free interaction for MR devices with multimodal sensing.

**Oracle Analytics Cloud** – Software Engineer Intern May 2021 – Aug 2021  
Improved UX and designed interactive data visualizations for big data service. Integrated a highly-requested plugin adding dynamic animated displays into product with 1 million users.

Contributed to MVP of prototype standalone console for WebLogic Server. Designed user help system and fixed UI bugs for REST-based web app launched to 7000+ corporations.

## Honors and Awards

A16. Cornell Fellowship, Cornell University	Aug 2023
A15. Gary Marsden Travel Award, ACM SIGCHI	Apr 2023
A14. Student and Postdoc Travel Award, BCI Society	Mar 2023
A13. Donald V. Jackson Fellowship, Georgia Tech College of Computing	Mar 2023
A12. Best Undergraduate Research Award, Sigma Xi	Feb 2023
A11. Best Demo Award, UbiComp/ISWC 2022 Conference	Sep 2022
A10. 2nd Place Oral Presentation Award, UROP Undergraduate Research Symposium	Apr 2022
A9. President's Undergraduate Research Travel Award, Georgia Tech	Mar 2022
A8. President's Undergraduate Research Salary Award, Georgia Tech	Aug 2021
A7. 1st Place Oral Presentation Award, UROP Undergraduate Research Symposium	Apr 2021
A6. Sait Halman Award for Excellence in Computer Science, Robert College	Jun 2019
A5. National Bronze Medal, Turkish Olympiad in Informatics	Nov 2018
A4. ICRA 2018 RoboMasters AI Challenge Finalist, DJI	May 2018
A3. ICRA 2017 Humanitarian Robotics Competition Finalist, IEEE RAS-SIGHT	May 2017
A2. Google Code-in Finalist for Mifos Initiative, Google	Feb 2016
A1. Google Code-in Finalist for RTEMS, Google	Feb 2015

## Publications

### Full Conference & Journal Papers (Refereed)

- C4. **Tan Gemicioglu\***, Thalia Viranda\*, Yiran Zhao\*, Olzhas Yessenbayev, Jatin Arora, Jane Wang, Pedro Lopes, Alexander T. Adams, Tanzeem Choudhury. **BreathePulse: Peripheral Guided Breathing via Implicit Airflow Cues for Information Work**. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '24). December 2024. [[PDF](#)]
- C3. **Tan Gemicioglu**, Elijah Hopper, Brahmi Dwivedi, Richa Kulkarni, Asha Bhandarkar, Priyanka Rajan, Nathan Eng, Adithya Ramanujam, Charles Ramey, Scott M. Gilliland, Celeste Mason, Caitlyn Seim, and Thad Starner. **Passive Haptic Rehearsal for Augmented Piano Learning in the Wild**. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '24). December 2024. [[PDF](#)]
- C2. **Tan Gemicioglu**, R. Michael Winters, Yu-Te Wang, Thomas M. Gable, Ivan J. Tashev. **TongueTap: Multimodal Tongue Gesture Recognition with Head-Worn Devices**. Proceedings of the 25th International Conference on Multimodal Interaction (ICMI '23). October 2023. [[DOI](#), [PDF](#)]
- C1. Naoki Kimura, **Tan Gemicioglu**, Jonathan Womack, Yuhui Zhao, Richard Li, Abdelkareem Bedri, Zixiong Su, Alex Olwal, Jun Rekimoto, and Thad Starner. **SilentSpeller: Towards mobile, hands-free, silent speech text entry using electropalatography**. Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22), April 2022. [[DOI](#), [PDF](#)]

### Posters and Demos (Refereed)

- D7. David Martin, Zikang Leng, **Tan Gemicioglu**, Jon Womack, Jocelyn Heath, Bill Neubauer, Hyeokhyen Kwon, Thomas Plöetz, Thad Starner. **FingerSpeller: Camera-Free Text Entry Using Smart Rings for American Sign Language Fingerspelling Recognition**. 25th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '23), October 2023. [[DOI](#), [PDF](#)]

- D6. **Tan Gemicioglu**, Yuhui Zhao, Melody M. Jackson, Thad Starner. **Transitional Gestures for Enhancing ITR and Accuracy in Movement-based BCIs**. Proceedings of the 10th International Brain-Computer Interface Meeting (BCI Meeting '23), June 2023. [[PDF](#)]
- D5. **Tan Gemicioglu**, R. Michael Winters, Yu-Te Wang, Thomas M. Gable, Ann Paradiso, Ivan J. Tashev. **Gaze & Tongue: A Subtle, Hands-Free Interaction for Head-Worn Devices**. Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA '23), April 2023. [[DOI](#), [PDF](#)]
- D4. **Tan Gemicioglu**, Mike Winters, Yu-Te Wang, and Ivan Tashev. 2022. **Tongue Gestures for Hands-Free Interaction in Head Worn Displays**. Proceedings of the 2022 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp/ISWC '22 Adjunct), September 2022. [[DOI](#), [PDF](#)]
- D3. Asha Bhandarkar, **Tan Gemicioglu**, Brahmi Dwivedi, Caitlyn Seim, and Thad Starner. **Learning Piano Songs with Passive Haptic Training: an Interactive Lesson**. Proceedings of the 2022 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp/ISWC '22 Adjunct). September 2022. (**Best Demo Award**) [[DOI](#), [PDF](#)]
- D2. **Tan Gemicioglu**, Noah Teuscher, Brahmi Dwivedi, Soobin Park, Emerson Miller, Celeste Mason, Caitlyn Seim, and Thad Starner. **Passive Haptic Rehearsal for Accelerated Piano Skill Acquisition**. Intelligent Music Interfaces Workshop at CHI Conference on Human Factors in Computing Systems (CHI IMI '22), April 2022. [[DOI](#), [PDF](#)]
- D1. Naoki Kimura, **Tan Gemicioglu**, Jonathan Womack, Richard Li, Yuhui Zhao, Abdelkareem Bedri, Alex Olwal, Jun Rekimoto, and Thad Starner. **Mobile, Hands-free, Silent Speech Texting Using SilentSpeller**. Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '21). May 2021. [[DOI](#), [PDF](#)]

## Patents

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- P1. Mike Winters, **Tan Gemicioglu**, Thomas Gable, Yu-Te Wang, Ivan Tashev. **Tongue-Gesture Recognition with Head-Mounted Inertial Measurement Units (IMUs)**. Filed 9/8/2022. Granted 6/25/2024 as US Patent 12,019,808.

## Presentations

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### Talks

- T2. 10th International BCI Meeting, co-host with Julia Berezutskaya Jun 2023  
*Machine Learning for Brain-Computer Interfaces*
- T1. Microsoft Research, hosted by Ivan Tashev Aug 2022  
*Tongue Gesture Recognition in Head Mounted Displays*

### Posters (Non-refereed)

- U5. Transitional Gestures for Enhancing ITR and Accuracy in Movement-based BCIs. GT Neuro Student Research Poster Session. April 2023.
- U4. Passive Haptic Rehearsal for Augmented Piano Learning in the Wild. GVU Center Spring Research Showcase. April 2023.
- U3. Neural Mechanisms for Implicit Learning of Motor Skills via Haptic Stimulation. CABI Callosum. April 2023.
- U2. Passive Haptic Rehearsal for Augmented Piano Learning in the Wild. Career, Research, and Innovation Development Conference. January 2023.
- U1. SilentSpeller: Towards mobile, hands-free, silent speech text entry using electropalatography. GVU Center Spring Research Showcase. April 2022.

## Teaching Experience

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### Graduate Teaching Assistant – Cornell University

Aug 2024 – Present

Course: INFO5920 - Specialization Project

Teaching assistant for 52-person primary Master's project course of Cornell Tech. Assisting student projects in health tech and urban tech with brainstorming and prototyping.

### Graduate Teaching Assistant – Cornell University

Jan 2024 – May 2024

Course: INFO6120 - Ubiquitous Computing

Primary teaching assistant for 15-person graduate course on ubiquitous computing. Gave lectures, graded assignments and assisted students with prototyping electronics.

### Undergraduate Teaching Assistant – Georgia Tech

Jan 2022 – May 2022

Course: CS3001 - Computing and Society

Taught 12-person discussion section of ethics course covering privacy, intellectual property and algorithmic bias. Led group discussions and graded written homework.

### OMSCS Teaching Assistant – Georgia Tech

Jan 2021 – May 2021

Course: CS6601 - Artificial Intelligence

Created teaching materials for 500 students in Georgia Tech's Online Master's degree program. Wrote an assignment to help students learn how to use Hidden Markov models using HTK and Docker.

## Service

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### Organizer

- Postdoc and Student Committee Chair, BCI Society Aug 2023 – Present
- Futuring SIGCHI Committee Member, ACM SIGCHI Sep 2022 – Present
- Postdoc and Student Committee Member, BCI Society Jan 2022 – Aug 2023

### Reviewer

CHI 2025, 2024; CHI 2024 LBW; IMWUT 2024, 2023; UbiComp/ISWC 2023; IJHCI 2024

### Student Volunteer

UbiComp/ISWC 2023, BCI Meeting 2023, UbiComp/ISWC 2022, IUI 2022

### Leadership and Outreach

- Vice President, RoboJackets Apr 2021 – Apr 2022
- Project Manager, RoboJackets Apr 2020 – Apr 2021

## Mentored Students

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### M.S. Students

- Chunhao Zou (Georgia Tech CS) Jan 2023 - May 2024  
Passive haptic rehabilitation app.
- Himanshu Dubara (Georgia Tech ECE) Jan 2023 - Aug 2023  
Passive haptic learning firmware.
- Richa Kulkarni (Georgia Tech CS) Oct 2022 - Aug 2023  
Passive haptic learning hardware.

## B.S. Students

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|---|---------------------|
| • <b>Charlie Zhang</b> (Cornell Summer Intern)<br>Acoustic sensing for passive vitals monitoring. | Jul 2024 - Present  |
| • <b>Peter Feng</b> (Georgia Tech CS)<br>Passive haptic learning studies.                         | Mar 2023 - May 2024 |
| • <b>Nathan Eng</b> (Georgia Tech CS)<br>Passive haptic learning web app.                         | Jan 2023 - Aug 2023 |
| • <b>Barnabas Li</b> (Georgia Tech CS)<br>Passive haptic learning pedagogy.                       | Jan 2023 - Aug 2023 |
| • <b>Priyanka Rajan</b> (Georgia Tech CS)<br>Passive haptic learning and rehabilitation.          | Aug 2022 - May 2024 |
| • <b>Diego De Dios Suarez</b> (Georgia Tech CS)<br>Passive haptic learning web app.               | Aug 2022 - Aug 2023 |
| • <b>Elijah Hopper</b> (Georgia Tech CS)<br>Passive haptic learning hardware.                     | Oct 2021 - May 2024 |
| • <b>Emerson Miller</b> (Georgia Tech CS)<br>Passive haptic learning pedagogy.                    | Oct 2021 - May 2022 |

## Press Coverage

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| • <b>MarkTechPost</b> – <a href="#">Researchers from Microsoft and Georgia Tech Introduce TongueTap</a> | Dec 2023 |
| • <b>Hackster.io</b> – <a href="#">Giving Your Computer a Tongue Lashing</a>                            | May 2022 |
| • <b>BuzzFeed</b> – <a href="#">Smart Retainer Could Let You Text With Your Tongue</a>                  | Jan 2022 |

## Technical Skills

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**Languages:** Python, C, C++, Java, MATLAB, R, Bash, JavaScript, SQL, HTML,  $\text{\LaTeX}$

**Frameworks:** Pytorch, Scikit-Learn, Tensorflow, Kaldi, HTK, ROS, React, Node.js, Android SDK, Unity

**Software:** Linux, Git, Docker, Maven, Gradle, OpenCV, Gazebo, Microsoft Azure, Doxygen

**Prototyping:** PCB design, surface mount soldering, 3D printing, laser cutting, KiCAD, Autodesk Fusion

**Sensing:** EEG, fNIRS, fMRI, ultrasound, IMU, PPG, LiDAR, capacitance, camera, eye tracking