Alperen Cimen

Department of Psychological & Brain Sciences

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Research Interest

My research interests lie in the intersection between experimental and computational neuroscience. My research aims to reveal a mechanistic understanding about network algorithms used by both artificial and biological neural networks.

Education

Graduate (PhD): UC Santa Barbara, Goleta, California, U.S. Fall 2026 – Present

- Prospective PhD student in the **Psychological & Brain Sciences** program, advised by **Dr. Andy Alexander**, with co-advisor **Dr. Nina Miolane**.

Undergraduate: Ozyegin University, Istanbul, Turkey Fall 2021 – Spring 2026

- B.S., **Electrical and Electronics Engineering**, Minor in Computer Science
  (Specialized in Digital Signal Processing)
- GPA: 3.56/4.00, (High-honor)
- Secured top 10% of my class (4th out of 55 students) in my major
- Professional athlete, University Triathlon Team

High School: SAIK High School, Isparta, Turkey Fall 2017 – Spring 2021

- **STEM** Track
- GPA: 3.53/4.00
- Founder and leader of cycling team
- Participated in multiple regional cycling races and represented my school in athletics

Publications & Preprints

1. *Learning rate collapse prevents training recurrent neural networks at scale*, **NeurIPS'25 - NeurReps Workshop, 2025**. [Paper]
   Bariscan Kurtkaya, Mehmet Harmanli*, **Alperen Cimen***, Andy Alexander, Nina Miolane, Fatih Dinc†, Yucel Yemez†

Attended Conferences

1. *NeuroZoo*, **Society for Neuroscience (SFN) both in '24 and '25**. [Poster'24] and [Poster'25].
   2024: H. Akengin*, **A. Cimen***, M. Yuksekgonul, A. Alexander, F. Dinc†
   2025: **Alperen Cimen**, Mert Yuksekgonul, Andrew S. Alexander†, Fatih Dinc†

2. *Dimensionality of population-level latent mechanisms encoding spatial representations*, **NeurReps'25 Conference.** [Poster].
   Nur E. Delikkaya*, **Alperen Cimen***, Francisco Acosta, Adele Myers, Andy Alexander, Fatih Dinc†, Nina Miolane†

Research Experience

Graduate

Researcher, The Alexander Lab, University of California, Santa Barbara
September 2026 – Present

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[1] (with ∗ for equal contribution, † for equal supervision.)

Undergraduate

Researcher, Geometric Intelligence Lab, University of California, Santa Barbara
June 2025 – February 2026

Under the supervision of **Dr. Nina Miolane** and **Dr. Fatih Dinc** at UCSB, I trained as a computational neuroscientist and contributed to a project studying why training large recurrent neural networks (RNNs) remains challenging despite their value for modeling complex neural computations. Current RNN research is typically limited to networks of size at most 5k–10k neurons due to GPU memory constraints and learning-rate collapse, which makes optimization increasingly unstable as network size grows. Our work identified the key sources of these training failures and demonstrated how population-coding frameworks can mitigate these limitations. Our work published in peer-reviewed NeurReps 2025.

Researcher, Medical and Biological Physics Lab, Ozyegin University.
December 2024 – May 2026

I am researching on revealing the population dynamics that emerge during learning in brains under the supervision of **Dr. M. Burcin Unlu**. To show them, I first initiated context-dependent standardized silico-tasks that mimic real-life conditions –mostly used to examine monkeys– and trained recurrent neural networks (RNNs) by using them. Subsequently, I employ various mathematical tools to show these emerging latent dynamics.

Researcher, The Alexander Lab, University of California, Santa Barbara
July 2024 – February 2026

During my time at UCSB, I received hands-on training in experimental neuroscience, including mouse handling, behavioral training, cranial-window preparations, and collecting neural activity datasets using both Mini2P calcium imaging and electrophysiology under the supervision of **Dr. Andy Alexander**. I designed and carried out an experiment to study how mice perform path integration on a circular, periodic track, and I am currently processing the imaging datasets with EXTRACT and behavioral variables with DeepLabCut to test whether retrosplenial cortex neurons exhibit Fourier-like periodic tuning predicted by our theoretical work. In parallel, I trained recurrent neural networks on synthetic path-integration tasks and found that they spontaneously learn Fourier-like basis functions and integrate velocity cues efficiently in periodic environments. Our preliminary results have been presented at NeurReps'25 Conference.

Researcher, Multirobot Intelligence & Perception Lab, Ozyegin University
February 2024 – August 2024

Developed a comprehensive benchmark of behavioral tasks for recurrent neural network (RNN) models and standardized traditional computational neuroscience tasks. Shared the entire codebase publicly with detailed explanations of all parameters under the supervision of **Dr. Sedat Ozer** and **Dr. Fatih Dinc**. Collaborated with teams from Ozyegin University, Stanford University, and UC Santa Barbara. Our findings were presented in SFN'24.

Fellowships

- Special research and travel grant from **Ozyegin University Engineering Faculty** to support my research at UCSB (one time, **$2k**) 2025
- Recipient of the 'Impact Scholarship' from **Bridge to Türkiye (BTF)** to support my research expenses (one time, **$3k**) 2025
- Honored with a fellowship from **Prof. McClelland** and **Prof. Feldman** that supports my research journey expenses at UCSB (one time, **$5k**) 2025
- Special research and travel grant from the **president of Ozyegin University** to support my summer internship at UCSB (one time, **$3k**) 2024
- Ozyegin University merit-based half tuition (%50) scholarship for 5 years (**$7k** per year) ..... 2021 - 2026
- Ozyegin University professional athlete scholarship for 5 years (**$2.2k** per year) ..... 2021 - 2026

Teaching Experience

X - University of California, Santa Barbara - Graduate Teaching Assistant Fall 2026

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Achievements

- We, as OzU Triathlon Team, secured **third place** in the men's category and **second** in the women's category at the Turkish National Triathlon Championship among all universities in Turkey 2022
- Ranked in **6'th** in **Turkish National Championships** in Mountain Biking .....2016 - 2021
- Achieved **1'st place twice** in road cycling races in Isparta ..... 2016 - 2021
- Ranked **1'st** and **3'rd** place in regional swimming race (Backstroke, 100m and Free style, 200m) .....2013 - 2016

References

Dr. Andy Alexander, **PhD advisor**. *andyalexander@ucsb.edu*
Dr. Nina Miolane, **Co-PhD advisor**. *ninamiolane@ucsb.edu*
Dr. M. Burcin Unlu, **Research advisor**. *burcin.unlu@ozyegin.edu.tr*
Dr. Fatih Dinc, **Mentor**. *fdinc@ucsb.edu*

Volunteering

Instructor, Learn English with Alperen 2026-Present

Started a volunteering project to help middle-school students from diverse backgrounds intuitively learn, use, and develop proficiency in English. Classes are held twice a week, each lasting approximately 40 minutes, during which intermediate and commonly used advanced grammar structures, vocabulary, reading, and listening skills are taught. In addition, the program emphasizes speaking practice, encouraging students to communicate freely in English. To date, three students have participated in and graduated from the program.

Volunteer, Bridge to Türkiye (BTF) 2024-Present

Volunteered in a scholarship program to assist in developing a fellowship for students pursuing research and seeking funding. Committed to mentoring students, who are beginning their research endeavors, by sharing my experiences that I had over the course of my research journey.

Instructor, Time Management Course, Ozyegin University 2022-2025

Developed and published over 4 hours of video content on Ozyegin University's main course website, available for student enrollment. Delivered 5+ seminars to engineering and counseling teams, focusing on advanced time management techniques and strategies.

Organizer and Speaker at Ozyegin AI Awerness Panel, Ozyegin University Fall 2023

Developed and executed various projects and seminars to demonstrate the transformative impact of Artificial Intelligence (AI) and how students can prepare for its future. Conducted interviews with professors to gather insights and recommendations for students. Created and distributed AI fact handbooks to students. Organized panels where professors shared their perspectives on AI's future, followed by Q&A sessions for student engagement.

Responisble for the Organization, Beyond the Adventure, Ozyegin University 2021-2023

Organized an annual event at Ozyegin University for approximately 100 underprivileged, disabled children. Coordinated activities including a specially designed parkour course, various games (darts, drawing, clay, balloon games), and lunchtime with student volunteers. Ensured a supportive environment by providing a dedicated space for families. Collaborated with professional psychologists for post-event observation of the children. The event aims to offer a day of fun and independence for the children and is held twice a year.

Healthy Life, Erasmus+ Project, Stockholm Sweden Summer 2022

How people can maintain a healthy life was explained and searched throughout the project by us as participants. Different healthy customs/behaviors that participants have all over the world were talked and it made us allow to share our cultures among us.

Founder, Cycling Club, Ozyegin University 2021-2022

In response to the inability of Ozyegin University's initial Cycling Club to survive, particularly during the COVID-19 pandemic, a new club has been founded. This club's mission is to centralize cycling in student life as a means to combat global issues such as climate change, obesity, and overconsumption of electricity, thereby promoting a healthier, more sustainable world.

Board member, Outdoor Sports Club, Ozyegin University 2021-2022

Led the university's oldest, largest, and most active club, organizing and hosting over 10 diverse activities such as hiking, camping, sailing, and airsoft. Promoted a love for the outdoors and encouraged an active and adventurous lifestyle among members.

Miscellaneous

Languages: Turkish (Native), English (Fluent)
Hobbies: Aviation, Coffee tasting, Origami, and Skiing.

Last Updated: May 27, 2026