Yigitcan Kaya
Postdoctoral Fellow – University of California, Santa Barbara

Teaching Statement

I have used teaching as a way to connect since my earliest days as a student. As a socially awkward undergraduate, I led study groups that not only supported learning but also built lasting friendships. Later, as a senior PhD student and now as a postdoc, I have mentored more than twenty interns and junior PhD students from diverse cultural and educational backgrounds, guiding them to discover their career paths and voices as researchers. While my circumstances have changed over time, my core approach to teaching has remained the same: *I seek to understand what motivates each learner, what their goals are, and what sparks their curiosity*. I believe students learn most effectively when inspired and encouraged, rather than when pressured by authority or fear of punishment. When students are truly motivated, they grow into independent thinkers who can make a positive impact on the world, a transformation I have been fortunate to witness many times. Below, I share my teaching experiences and the philosophies that have shaped them.

Teaching Experience

I have designed and delivered several lectures on AI and Security to students at various levels. The following experiences helped me refine my teaching style and improve my ability to structure lectures effectively.

2025 **Santa Barbara City College (SBCC)** — Delivered two guest lectures to first-year community college students from all majors, titled "AI: Promise, Problems, and How to Use It Well." Anonymous student feedback described the lectures as engaging and eye-opening, with many noting a new awareness of issues such as hallucination, sycophancy, environmental impact, and bias. A follow-up series for SBCC faculty is scheduled for Fall 2025.

2025 **ACTION Institute Summer Internship** — Led a weekly reading group for undergraduate interns. Organized seminar-style paper discussions in computer security, beginning each session with a background lecture. Facilitated paper reviewing, discussion, and participation, helping students develop scientific reading and critical analysis skills.

2022 **University of Maryland** — Delivered two guest lectures on security and privacy in AI for Prof. Dave Levin's graduate security course. Contributed an assignment and exam questions. Mentored a student group on their class project, which later resulted in a top-tier publication.

2021 **Computer Science Research Community (Turkey)** — Delivered an introductory lecture on "Security Problems in Deep Learning," covering fundamentals and open challenges. Received highly positive feedback from students who expressed increased interest in research.

Promoting Engagement Inside and Outside the Classroom

"*Is attendance mandatory? I learn better from the textbook*". As an undergraduate, this honest question offended my linear algebra professor, and ashamed, I withdrew from the course. Many lectures then seemed less effective than self-study or online resources. After all, I thought, how could anyone improve on Gilbert Strang's linear algebra lectures at MIT?

With world-class lectures only a click away, my role is to offer what books and videos cannot: active engagement with me, peers, and the material. I build on personal experience and lessons from inspiring instructors to promote engagement through the following techniques.

Designing lectures for engagement. Students often disengage, silently asking, "*Why do I need to know this?*" or "*How is this useful?*" These questions arise when the material lacks motivation or connection to a broader context. To address this, I structure lectures around concrete, relatable problems, emphasizing their history, relevance, and practical importance.

I use relatable examples and case studies to anchor the discussion. For example, in my lecture at SBCC, I used viral social media posts to illustrate "AI overreliance." After establishing the context, I invited students to share perspectives, helping them connect personally. In my experience, this top-down approach has been effective: SBCC students described my lectures as "engaging" and "energetic," and many noted that their perspectives on AI's role in society had shifted as a result.

When students see the value of what they are learning, they are more likely to explore beyond the classroom, for instance, through mini research projects. I view this as a bridge between my teaching and research, and an opportunity to attract

future graduate students to my team. For example, after my graduate lectures at UMD, I encouraged one group to pursue an AI security project that later became a top-tier publication.

Engaging every student. With growing enrollments, crowded STEM classrooms risk favoring a few eager voices. To counter this, I experimented with two approaches. First, inspired by one of my favorite professors, I designate the front rows as an "interactive zone" and call on students who choose to sit there. Making participation the default helps new voices to gain confidence to join. Second, I incorporate in-class *active learning exercises* where students solve small but interesting problems together. Research shows these activities both clarify concepts and give everyone a chance to participate. I implemented both strategies in my lectures at SBCC: calling on front-row students broadened participation, while group exercises prompted students to engage with me and with peers. Student feedback confirmed these practices made the lectures more engaging.

Extending learning beyond the classroom. Today's students communicate through fast, informal, and multimodal channels. For example, they use memes to express emotions or podcasts to explore new ideas, while traditional formats like emails feel cumbersome. To better align with these preferences, I plan to incorporate platforms such as Slack or Discord. These tools can facilitate quick questions, collaborative discussions, and a sense of community beyond class hours.

Class projects are another powerful way to keep students engaged beyond the classroom. I particularly value capture-the-flag (CTF) style assignments, such as building and breaking AI models. Their competitive format makes learning both fun and motivating, while offering hands-on experience with real security and AI problems. Through my work on the iCTF competitions at UCSB for high school and undergraduate students, where I designed several challenges, I have observed how such activities spark curiosity, creativity, and teamwork.

"Be Curious, Not Judgmental"

The TV show Ted Lasso, about a wholesome American football coach who moves to England to lead a soccer team, has sparked discussion about what it means to be a leader. The old model of forcing people to their limits is being replaced by more empathetic, motivating, and vulnerable leadership. One of Ted Lasso's guiding tenets is to stay open-minded and curious about the people he leads, rather than rushing to judgment. It is always easier to say, "This is the best for you," than to say, "Let's discover together what is best for you and work toward it." Embracing this philosophy has led to some of the most rewarding experiences of my academic journey.

Student Supervision and Mentorship

In the past six years, I have mentored and supervised more than 20 interns and junior PhD students from seven countries. During my two summers as a postdoc, I served as the primary supervisor for large intern cohorts, overseeing their training, designing research projects, and fostering both progress and a healthy, inclusive team environment. At the end of my second summer, the interns surprised me with handwritten cards; one read, "*You are going to be an amazing professor.*" This was a profoundly validating and encouraging moment. Ultimately, these mentorship experiences resulted in eight top-tier publications (four with interns, four with junior PhD students) and, more importantly, highlighted the growth of my mentees as they matured into researchers.

I have seen interns leave convinced that research was not their path, and others who could not wait to return for a PhD. I coached many through the application process, helping them highlight their strengths and identify programs that matched their passions and personalities. Several came from nontraditional or underrepresented backgrounds, and it was especially meaningful to help them navigate structural barriers and build confidence in their abilities. Six of these interns have since been accepted into top PhD programs, where they are making valuable contributions in both AI and security.

These experiences have made me a better listener and a more compassionate mentor, deepening my respect for diverse backgrounds, perspectives, and personalities. They showed me that true leadership means putting people first, caring about their motivations, aspirations, and growth, and ensuring that everyone feels welcome and supported. It has been rewarding to earn the trust of my interns as both a mentor and a friend who looks out for their best interests.

As a professor, I aspire to continue following Ted Lasso's tenet, forming human-centered, long-lasting connections that create an inclusive and supportive environment for teaching and learning.

Courses I Can Teach

With my CS background, I can teach lower-division undergraduate CS courses such as **Introduction to Programming**, **Data Structures**, and **Algorithms**, as well as upper-division courses including **Operating Systems**, **Artificial Intelligence / Machine Learning**, and **Introduction to Security**.

My teaching experience at SBCC has inspired a passion for **Interdisciplinary AI** courses, such as UC Berkeley's Data-8. As AI skills become essential across various professions, most students lack a clear understanding of how AI works, amplifying risks of misuse and societal harm. I would design an undergraduate course that combines foundational knowledge with practical skills while addressing AI's societal, technological, and cognitive risks to promote responsible use.

At the graduate level, I envision courses that build on my research expertise. A **Trustworthy AI** course would cover privacy, bias, robustness, and misuse in AI systems, similar to the one offered at Cornell University. An **AI for Security** course would explore current and emerging applications of AI in malware detection, program analysis, and cybersecurity more broadly. Both courses would feature CTF-style "build-it, break-it" challenges, giving students hands-on experience designing and attacking AI systems.