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TEACHING AND LEADERSHIP STATEMENT

"I cannot teach anybody anything, I can only make them think." [attributed to Socrates] [1] or more formally, as he defended himself in court by explicitly stating: "I have never been anyone's teacher ... if anyone says he has learned or heard anything from me privately that everyone else did not hear, be assured he is not telling the truth." [2][Apology 33a–33b]. I would have to add: Rest assured that it is my observation that for whatever reason most people, when they see what and how I do things, would love to learn that magic.

TEACHING PHILOSOPHY

The following principles are characteristic of my teaching philosophy:

1. inspire curiosity, motivate creativity, and ignite passion through compelling historical milestones and contemporary success stories of my own.
2. enable in-depth comprehension of basic concepts first. This aligns with "Dem Anwenden muß das Erkennen vorausgehen" (Max Planck) [3], that is "Understanding must precede application".
3. wherever possible, cultivate while explaining a balanced synergy of theory and practice.
4. guide your audience to connect the new material with their prior knowledge and experience, providing targeted brush-ups when needed.
5. steadily mentor scholars to develop into exceptionally rigorous scientists and engineers who fully comprehend and honor the profound legacy of 'I have learned to use the word "impossible" with the greatest caution' (Wernher von Braun) [4].
6. nurture your own unique personal expressiveness.

I developed and refined this teaching philosophy through my roles as a faculty member and external thesis advisor across universities in the U.S. and Europe. In these positions, I have taught degree-level courses across Electrical Engineering, Computer Engineering, Mathematics, Computer Science, and Software Engineering (for the engineering degrees: ABET-accredited). My academic appointments include serving as an Adjunct Associate Professor in the Department of Mathematics



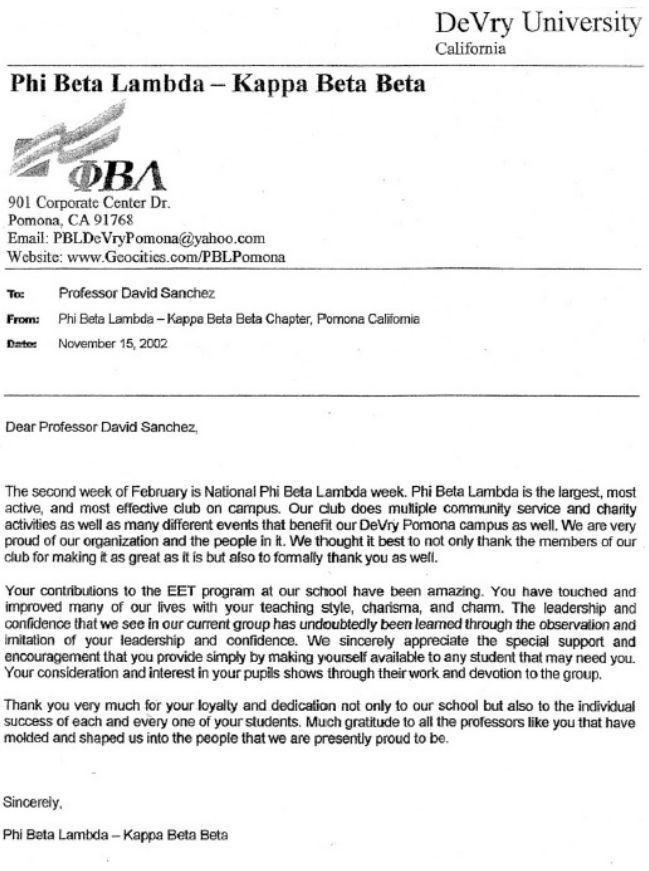
(a) DeVry University Pomona California (b) Technische Universität München (c) Siemens Zentrum Frankfurt

Universities, Industry Training Centers I have been faculty member, external thesis advisor, taught at

and Computer Science at the University of Miami (Coral Gables, FL), and as a Professor at DeVry University and its Keller Graduate School of Management (Pomona, CA). Additionally, during my decade-long tenure as a Senior Research Scientist at the Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center DLR) in Oberpfaffenhofen, I served as an External Thesis Advisor for Computer Science at the Technische Universität München (Technical University of Munich) and for Computer Engineering at the Hochschule München (Munich University of Applied Sciences). In this role, I advised theses focusing on Artificial Intelligence, Machine Learning, Computer Vision, Robotics, and Parallel Computation. My instructional experience also includes delivering computer and software engineering courses to university-degreed professionals at the Siemens Computer Training Center in Frankfurt, Germany.

TEACHING EXPERIENCE AND METHODS

To ground my teaching experience and methods, I present an example during my time as Professor at DeVry University teaching Electrical and Computer Engineering in connection with Mathematics as well. In electronics, one basic signal that synchronous digital circuits use is a clock signal which oscillates between a high and a low state at a constant frequency. The associated transition times are called the rise time t_r and the fall time t_f and are defined as the time it takes the voltage to change between 10% and 90%. Mathematically, a first approximation of such a signal is an ideal clock signal, a square wave, whose transitions between high and low happen instantaneously, that is zero rise and fall time, infinite slew rate since the slew rate is the rate of change of voltage with respect to time $\frac{dV}{dT}$, typically measured in $[V/ns]$. For a more accurate approximation, where rise and fall times are not linear, exponential curves are used. Let us take for example a voltage signal that start at $0V$ level and rises to the supply voltage $V_{DD} = 5V$ at $t = 0$. The first rising edge can then be modeled as: $V(t) = V_{DD} \cdot (1 - e^{-\frac{t}{\tau}})$ with τ the time constant. $t_r = t_2 - t_1$ with $V(t_1 = -\tau \ln(0.9)) = 10\%V_{DD}$, $V(t_2 = -\tau \ln(0.1)) = 90\%V_{DD}$ results in $t_r \approx 2.2\tau$.



DeVry University
California

Phi Beta Lambda – Kappa Beta Beta

ΦBΛ

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To: Professor David Sanchez
From: Phi Beta Lambda – Kappa Beta Beta Chapter, Pomona California
Date: November 15, 2002

Dear Professor David Sanchez,

The second week of February is National Phi Beta Lambda week. Phi Beta Lambda is the largest, most active, and most effective club on campus. Our club does multiple community service and charity activities as well as many different events that benefit our DeVry Pomona campus as well. We are very proud of our organization and the people in it. We thought it best to not only thank the members of our club for making it as great as it is but also to formally thank you as well.

Your contributions to the EET program at our school have been amazing. You have touched and improved many of our lives with your teaching style, charisma, and charm. The leadership and confidence that we see in our current group has undoubtedly been learned through the observation and imitation of your leadership and confidence. We sincerely appreciate the special support and encouragement that you provide simply by making yourself available to any student that may need you. Your consideration and interest in your pupils shows through their work and devotion to the group.

Thank you very much for your loyalty and dedication not only to our school but also to the individual success of each and every one of your students. Much gratitude to all the professors like you that have molded and shaped us into the people that we are presently proud to be.

Sincerely,

Phi Beta Lambda – Kappa Beta Beta

Student Endorsement Letter – DeVry University
Pomona, California

While overseeing a digital circuits laboratory one afternoon, I noticed that several native-speaking students struggled to follow the lab manual's instructions for measuring the rising and falling edges of real digital signals. Upon speaking with them, I realized they actually remembered the mathematical form of an exponential decay function $f(t) = e^{-t}$ from their calculus course, but they could not map that calculus math to the signal modeling and rise-time measurements they were required to perform in the lab. I immediately brought them to the large lab whiteboard to sketch out the waveforms, explain the underlying calculus explicitly needed for their tasks, and address all their questions. Following this brief session, the students clearly understood the conceptual gap, gained confidence, and successfully completed all of their measurements. This intervention marked a complete turnaround in student sentiment. They shifted from being entirely disoriented to being highly motivated to build, test, and measure any electronics required.

My experience extends to have been contracted by Prentice Hall (Pearson) to review and improve textbooks and laboratory manuals for ABET-accredited degree program coursework in Electrical and Computer Engineering as well as Computer and Information Sciences. The required level of sophistication was exceptionally high, as these textbooks were already in their fifth or later editions—having undergone multiple rounds of refinement—and were typically co-authored by extensive teams of senior faculty. My supervision of computer science (e.g., computer vision and robotics [5]) and computer engineering (e.g., artificial intelligence, machine learning, and parallel computation [6]) theses bridges theory and practice, requiring me to teach and mentor students through graduate-level frameworks. Two examples, by no means an exhaustive list, include being External Thesis Advisor at DLR for the Department of Computer Science at the Technical University of Munich and for the Department of Computer Engineering at the University of Applied Sciences, Munich, Germany. I was enchanted to intensively prepare the students since the knowledge demanded by these two theses aligns with the advanced core of Ph.D.-level textbooks, such as those for approximation theory [7], numerical methods [8], parallel computation [9], statistical learning [10], deep learning [11], computer vision [12], and robotics [13].

CLASSES

I am eager to teach core and elective courses at both the undergraduate and graduate levels. My primary focus is to guide students in reinforcing their theoretical foundations with practical applications through tailored exercises and substantial class projects, ultimately enabling them to tackle complex, real-world problems. In Mathematics, I am equipped to teach Ph.D.-level courses such as Real Variables, Algebraic Topology, and Abstract Algebra. Within Computer Science, my Ph.D.-level teaching portfolio includes Cybersecurity, Advanced Artificial Intelligence, and Autonomous Robotic Systems. Furthermore, in Electrical and Computer Engineering, here too, my academic and research expertise uniquely qualifies me to teach B.S./M.S. courses in Algorithms, Embedded Microprocessor System Design, and Computer Operating Systems, alongside advanced Ph.D. courses in Machine Learning, VLSI Systems, Statistical Learning, Robotics and Intelligent Systems, Computer Vision, and Quantum Computing.

LEADERSHIP

During my decade of distinguished civil servant service at the German Aerospace Center (DLR), I co-initiated Germany's First Federal Program for AI/ML Research and Technology Development (R&TD) with the Bundesminister für Forschung und Technologie (Office of the German Federal Ministry of Research and Technology BMFT) [14]. This initiative funded elite nationwide consortia of top universities, national labs, and industrial R&D centers—including a prominent consortium I co-led between DLR, Technische Universität München (TUM), and Siemens Corporate R&D in Munich. Furthermore, my work with the BMFT which launched this foundational program initiatve (more than one round of funding) directly drove pioneering institutional innovation, leading to the establishment of the dedicated Institut für Neuroinformatik in Bochum and Ulm beginning in 1990. The first Machine Learning Department in the U.S. was created at CMU in 2006.

My global professional service is highlighted by having founded the Elsevier Science journal Neurocomputing and serving as its Chief Scientist and Editor-in-Chief for 15 years [15], establishing it as a world-renowned publication in AI/ML. During my tenure, I built and led an exceptional Editorial Board comprised of leading global scholars, including below a few notable members of that distinguished constellation:

1. Eugene McDermott Professor Tomaso Poggio, Massachusetts Institute of Technology (MIT), Cambridge, MA, U.S.A.
2. Don D. & Ruth S. Eckis Endowed Distinguished Professor José C. Príncipe, University of Florida, Gainesville, FL, U.S.A.

3. Harold W. Cheel Professor Kumpati S. Narendra, Yale University, New Haven, CT, U.S.A.
4. Professor Walter J. Freeman III, University of California, Berkeley (UCB), Berkeley, CA, U.S.A.
5. Professor David E. Rumelhart, Stanford University, Stanford, CA, U.S.A.
6. Professor Dr. Wilfried Brauer, Technische Universität München, Munich, Germany
7. Professor Dr. Günther Palm, Universität Ulm. Ulm, Germany
8. Professor Dr. Fionn Murtagh, University of Huddersfield, Huddersfield, United Kingdom (U.K.)
9. Professor Dr. ir. Joseph P. Vandewalle, Katholieke Universiteit Leuven, Belgium
10. Professor Dr. Erkki Oja, Helsinki University of Technology, Helsinki, Finland
11. Professor Lakhmi C. Jain, University of South Australia, Adelaide, Australia
12. Professor Shun-ichi Amari, University of Tokyo, Tokyo, Japan
13. Professor Soo-Young Lee, Korea Advanced Institute of Science and Technology (KAIST), South Korea

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