

Dr. Ilan Ben-Yaacov

UNIVERSITY:

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SUMMARY AND PROFESSIONAL INTERESTS

I'm an Associate Teaching Professor (LSOE) at U.C. Santa Barbara, where I teach undergraduate and graduate courses in the Electrical and Computer Engineering Department (and previously also taught in the TMP and CCS Physics Programs), as well as running all of the EE senior design projects (in partnership with industry and research group partners). In my spare time I work as a Patent/IP consultant, in particular for tech start-ups, and have taught a number of Patent/IP courses and conducted numerous seminars and workshops.

TEACHING / ACADEMIC EXPERIENCE

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Santa Barbara, CA

3/2004 – present Lecturer

- LSOE, ECE Department 7/2017 – present
- Continuing Lecturer, ECE Department 7/2011 – 6/2017
- Lecturer (Unit 18), ECE Department and College of Engineering 3/2004 – 6/2011
- Lecturer (Unit 18), Technology and Management Program (TMP) 9/2011 – 12/2014
- Lecturer (Unit 18), College of Creative Studies (CCS) Physics 9/2006-6/2011

Below is a sampling of the courses I currently teach or have taught recently:

- **ECE 188A/B/C – EE Senior Capstone Design Projects.** In groups, students design, build, and test a significant EE-based project.
- **ECE 220A / 124B / 120A – Fundamentals of Semiconductor Device Processing.** Senior level / graduate EE elective course, includes lab in which students fabricate and test silicon MOSFETs in the UCSB Instructional Cleanroom.
- **ECE 124C / 120B – Integrated Circuit Design and Fabrication.** Senior level EE course. In lab, students design a silicon-based IC, have masks made, and then fabricate and test the circuit in the UCSB Instructional cleanroom. Class curriculum includes semiconductor device physics and design of advanced structures.
- **ECE 132 – Introduction to Solid State Semiconductor Devices**
- **ECE 134 – Introduction to Field Theory** (E&M for electrical engineers).
- **ECE 5 – Introduction to ECE.** Arduino-based projects for EE freshmen.
- **TMP 131 / TMP 251 / ENGR 291G – Introduction to Patents and Intellectual Property.** Undergraduate and graduate courses which I developed for the Technology and Management Program (TMP).
- **ECE 2A/2B – Circuits, Devices, Systems.** Introduction to electrical systems and circuit analysis.
- **PHYS CS 31-36 – Advanced first- and second-year physics courses** taken by highly talented physics undergraduates in the College of Creative Studies at UCSB.
- **ENGR 3 – Introduction to C Programming and MatLab.**

UNIVERSITY SERVICE

University of California, Santa Barbara, CA

- 9/2018 – present Chair of ECE Capstone Committee
- 9/2017 – present Member of ECE 10 Ad-Hoc Committee
- 9/2017 – present Member of CoE ABET Ad-Hoc Committee
- 9/2011 – present ECE Undergraduate Advisor
- 8/2005 – present Member of the ECE Undergraduate Curriculum & Affairs Committee
- 9/2013 – 12/2015 Member of the Non-Senate Faculty Development Fund selection committee
- 9/2014 – 6/2016 Committee member, Council on Faculty Issues and Awards (CFIA)

RESEARCH AND PROFESSIONAL EXPERIENCE

INDEPENDENT IP CONSULTANT

- 8/2009 – present Provide a variety of IP services, primarily to tech start-ups, including patent drafting and prosecution, IP portfolio advising and management, advising on domestic and foreign filing strategies, trademarks, NDAs, license agreements, and IP due diligence for investment rounds.

APEEL SCIENCES, INC.

- 5/2015 – 2/2020 IP Specialist / head of IP at Apeel Sciences in Santa Barbara, CA, an Ag-tech start-up company developing coatings from natural plant extracts which reduce pesticide use and increase shelf life of produce without refrigeration.

TRANSPHORM, INC.

- 8/2007 – present Senior IP Adviser (8/2015-present), IP Manager (1/2011-8/2015) and Patent Engineering Consultant (8/2007-12/2010) at Transphorm, Inc in Goleta, CA, a start-up company specializing in GaN-based semiconductor devices and modules.

TECHNICAL WRITING

- 3/2004 – 6/2006 Technical writer – Assisted with writing a graduate textbook on Semiconductor Device Physics with Prof Umesh Mishra (UC Santa Barbara) and Prof Jasprit Singh (University of Michigan).

INTEL Corporation

- 4/2005 – 9/2005 Consultant – Developed cleanroom processes for the fabrication of novel photonic integrated circuit structures. Processing performed in UCSB Nanofab cleanroom.

UCSB Department of Electrical Engineering**Santa Barbara, CA**

9/1999 – 3/2004 Research Assistant – PhD student in Professors Mishra's and DenBaars' groups at UCSB. Designed, fabricated, and tested GaN-based HEMTs and CAVETs for power switching applications. For CAVET project, I grew all material by MOCVD, designed and fabricated all devices, and performed all device electrical characterization.

Achievements:

- First reported demonstration of an AlGaIn/GaN CAVET (2001)
- First small-signal RF measurement of an AlGaIn/GaN CAVET (2003)

Research Experience:

- Epitaxial growth of III-V Nitride semiconductors by metalorganic chemical vapor deposition (MOCVD)
- Design, fabrication, and characterization of nitride-based HEMTs and CAVETs
 - Design tools: Tanner L-Edit, SRIM 2003 (ion implant simulation), 1D Poisson solver
 - Fabrication experience: stepper lithography, RIE, ICP, e-beam evaporation, Sputtering, PECVD, RTA
 - Characterization techniques: AFM, SEM, photoluminescence, Van der Pauw Hall, and XRD
- DC and small-signal RF characterization of CAVETs, extraction of small-signal equivalent circuit

Canterbury University Department of Physics and Astronomy**Christchurch, NZ**

3/1998 – 10/1998 Senior Thesis Project – Characterized the effects of reactive ion etching on the optical properties of GaN. Research published in APL and presented at 1999 Australian and New Zealand Institute of Physics Condensed Matter Physics Conference.

Stanford Linear Accelerator Center**Stanford, CA**

6/1996 – 9/1996 Summer Research Student – Atomic force microscopy study of high electric field breakdown through thin oxide layers on copper. Research presented at the 19th Surface/Interface Research Mtg., NCCAVS.

EDUCATION UNIVERSITY OF CALIFORNIA, SANTA BARBARA**Santa Barbara, CA**

Ph.D. in Electrical and Computer Engineering, March 2004

M.S. degree in Electrical Engineering, June 2002

B.S. degree in Physics, March 1999 (Final year at University of Canterbury, NZ)

AWARDS AND HONORS

- UCSB Non-Senate Faculty Development Fund Grant, 2015
- UCSB Non-Senate Faculty Development Fund Grant, 2014
- Outstanding Faculty Award for Excellence in Teaching, UCSB ECE Dept, 2004-05
- Lancaster Award, Best UCSB PhD Dissertation in Engr / Phys Sciences, 2004. Nat'l finalist.
- American Society for Engineering Education NDSEG Fellowship, 2000
- Fannie and John Hertz Foundation Research Fellowship Grant, 2000
- UCSB Physics Department Outstanding Graduating Senior, 1999
- Barry M Goldwater Scholarship for Excellence in Science and Mathematics, 1997
- UCSB Chancellors Award for Academic Excellence, 1994

SELECT PUBLICATIONS

A A Rowe, A J Bonham, R J White, M P Zimmer, R J Yadgar, T M Hobza, J W Honea, **I Ben-Yaacov**, and K W Plaxco, 'CheapStat: An Open-Source, "Do-It-Yourself" Potentiostat for Analytical and Educational Applications', *PLoS ONE* 6(9): e23783. doi:10.1371/journal.pone.0023783, Sept 2011.

I Ben-Yaacov, 'AlGa_N/Ga_N Current Aperture Vertical Electron Transistors', PhD Thesis, University of California, Santa Barbara, 2004.

I Ben-Yaacov, Y-K Seck, U K Mishra, and S P Denbaars, 'AlGa_N/Ga_N current aperture vertical electron transistors with regrown channels', *Journal of Applied Physics*, 95(4), 2004.

Y Gao, **I Ben-Yaacov**, U K Mishra, and E L Hu, 'Optimization of AlGa_N/Ga_N current aperture vertical electron transistor (CAVET) fabricated by photoelectrochemical wet etching', *Journal of Applied Physics*, 96(11), 2004.

Y Gao, A R Stonas, **I Ben-Yaacov**, U K Mishra, S P DenBaars, and E L Hu, 'AlGa_N/Ga_N current aperture vertical electron transistors fabricated by photoelectrochemical wet etching', *Electronic Letters*, 39(1), 2003.

S Keller, S Heikman, **I Ben-Yaacov**, L Shen, S P DenBaars, and U K Mishra, 'Indium surfactant assisted growth of AlN/GaN heterostructures by metal-organic chemical vapor deposition', *Physica Status Solidi A*, 188(2):775–8, 2001.

SELECT PATENTS

U Mishra, S Chowdhury, and **I Ben-Yaacov**, 'SEMICONDUCTOR DEVICES WITH INTEGRATED HOLE COLLECTORS', issued as U.S. patent number 9,184,275 on November 10, 2015.

S Chowdhury, R Yeluri, C Hurni, U K Mishra, and **I Ben-Yaacov**, 'CURRENT APERTURE VERTICAL ELECTRON TRANSISTORS WITH AMMONIA MOLECULAR BEAM EPITAXY GROWN P-TYPE GALLIUM NITRIDE AS A CURRENT BLOCKING LAYER', issued as U.S. patent number 8,937,338 on January 20, 2015.

U K Mishra, R Coffie, L Shen, **I Ben-Yaacov**, and P Parikh, 'ENHANCEMENT MODE III-N HEMTS', issued as U.S. patent number 8,519,438 on August 27, 2013.

Y Wu, U K Mishra, P Parikh, R Chu, **I Ben-Yaacov**, and L Shen, 'SEMICONDUCTOR HETEROSTRUCTURE DIODES', issued as U.S. patent number 7,898,004 on March 1, 2011.

J Honea, P Parikh, Y Wu, and **I Ben-Yaacov**, 'III-NITRIDE BIDIRECTIONAL SWITCHES', issued as U.S. patent number 7,875,907 on January 25, 2011.

C S Suh, **I Ben-Yaacov**, R Coffie, and U K Mishra, 'INSULATED GATE E-MODE TRANSISTORS', issued as U.S. patent number 7,851,825 on December 14, 2010.

C S Suh and **I Ben-Yaacov**, 'III-NITRIDE DEVICES WITH RECESSED GATES', issued as U.S. patent number 7,795,642 on September 14, 2010.