



Do Amerike i natrag

doc. dr. sc. Dubravko Babić



Kratka biografija

- 1982. dipl. ing. FER/Zagreb (Industrijska elektronika)
- 1985. Master of Science, 1995. Doctor of Philosophy, Electrical and Computer Engineering, University of California, Santa Barbara, CA.
- 20+ godina života u Silicijskoj dolini (Avantek, Hewlett-Packard Laboratories)
- Osnivač/suosnivač tri start-up poduzeća (Alvesta, Group4 Labs, Eridan Communications)
- Sudski vještak za intelektualno vlasništvo (5+ godina)
- Dugi niz godina nezavisni savjetnik za tehnologiju i patente (SAD, Izrael)
- od 2012. radim na FER-u.

- Počeo rad u poluvodičkoj tehnologiji, potom kroz tu tehnologiju ušao u fotoniku i visokofrekventnu elektroniku - tehnologiju komunikacijskih komponenti i podsustava.



Sadržaj predavanja

- Utisci o diplomskoj nastavi u Kaliforniji
 - sa stanovišta studenta FERa
 - sa stanovišta asistenta na UCSB i poslodavca u Kaliforniji
- Doktorski studij u Kaliforniji
 - kako funkcionira, koji su rizici i beneficije
 - kako fakulteti ostvaruju napredak



Usporedba studija

FER 1982.	UCSB	FER 2015.
4.5 godina Dipl. ing	4 godine BSEE	3 godine Baccalaureate
Magisterij	MSEE	Magisterij
Doktorat	Doktorat (Ph.D)	Doktorat

University of California, Santa Barbara

Diplomski 20.000 studenata, post-diplomski studij: 3.000 studenata (2014.)

Electrical and Computer Engineering

- Communications & Signal processing
- Control Systems
- Computer Systems
- Electronics & Photonics (Compound Semiconductor Devices)
 - 1982. to područje se zvalo *Emphasis in Solid-State Electronics*



1982 prva zgrada
2015 tri zgrade

Utisci o diplomskoj nastavi na UCSB/ ECE

- Predavanja drži isključivo profesor,
- nema stalno zaposlenih asistenata na fakultetu, svu ostalu nastavu održavaju “teaching assistenti”.
- Zbog toga postoji vidljiv raskorak među u temama koje se predaju i vježbi u laboratorijima i zadaćama. Nastava stoga često nije koherentna i nije se mogla usporediti s FER-om.
- Studenti su uglavnom nespremni za samostalan rad, a samostalni rad i vlastita motivacija su ključ uspjeha – studenti su prepušteni sami sebi.
 - Dodatna predavanja (auditorne vježbe na FER-u bi pomogle)



Uspredba s diplomskim studijem na FER-u:

- Što sam dobro naučio? Matematiku i elektroniku te stekao praktično znanje o mnogočemu što prosječni inženjer na UCSB-u ne zna.
 - npr. primjene transformatora, asinhroni motor i triac-kontrola intenziteta svjetla u žaruljama
- Usprkos mogućnostima koje pružaju UCSB laboratoriji, BSEE ili MSEE inženjeri imaju relativno specijalizirano i teorijsko znanje (ovisno o području interesa) kada završavaju. FER je tu u velikoj prednosti.
- Moja iskustva sa zapošljavanjem inženjera u CA: Slabo praktično znanje, zapošljavao sam karakter i očekivao da će znanje i iskustvo steći.
 - Npr. moj inženjer G4L je prihvatio raditi čak i bez plaće samo da bi stekao iskustvo

Software vs. Hardware

- Stigao sam u Silicijsku dolinu krajem 1985., na kraju “Hardware” razdoblja (DOS 1981., prvi Apple Macintosh 1984.).
- Od tada broj poslova u software-u stalno raste.
- Za hardware inženjera se podrazumijeva da zna napisati efikasan kod,
- međutim, broj inženjera elektrotehnike koji znaju software, a ne razumiju hardware također raste.
 - npr. zapošljavanje inženjera sa UCB-a u HP Labs-u da bi automatizirali wafer-bonding mašine.
 - npr. bez GUI-a, samo funkcionalnost



Poslijediplomski studij na UCSB-u

- Za poslijediplomski studij (magisterij ili doktorat) se natječu inženjeri ili fizičari iz cijelog svijeta.
 - Kriteriji: ocjene, GRE i TOEFL
- Asortiman najboljih ljudi na svijetu.
- U usporedbi s njima, FER mi je dao izvrsno predznanje matematike, elektronike i obrade signala. Ali u području poluvodičke fizike i rada elektroničkih komponenti sam se morao dodatno obrazovati.



Financiranje postdiplomskih studenata

Ako nemate mentora: radite kao „Teaching Assistant” za diplomski studij (čuvanje laboratorija, ispita, ispravljanje zadaća, konzultacije), može se magistrirati samo sa završnim ispitom (1 godina).

Ako imate mentora, „Research Assistant” (rad na istraživanju), završava se magistarskim radom i obranom (> 1 godine).

- Od zarade se plaćala školarina do 1990-ih, danas se školarina “research assistant”-a plaća direktno s projekta.



Postupak stjecanja doktorata

- Upis: ocjene (GPA), GRE, TOEFL
- Slušanje kolegija i polaganje ispita
- „screening exam” / prijemni ispit za doktorski studij:
 - pismeni ispit iz matematike (4 od 7 zadataka) i usmeni ispit (3 profesora)
 - uči se mjesecima,
 - može se izaći na ispit samo 2 puta
 - prolaznost ~ 60%
- Radite kao “research assistant” na projektu, izabirete komisiju i predlažete temu („Qualifying Exam” , javni razgovor)
- Obrana doktorata („PhD defense”)



Utisci s doktorskog studija na UCSB-u

- Kriterij za dobivanje istraživačkog zaposlenja jako ovisi o ocjenama i o uspjehu na kolegijima doktorskog studija.
- Ako ste došli s idejom, postupak stjecanja doktorata ide relativno brzo (>3 godine).
- Ako niste, projekt može imati jasan cilj, ali nije jasno može li se i kako ostvariti.
 - Uz to se natječete s drugim fakultetima i istraživačkim laboratorijima u svijetu.
- Rizik: možete dugo vremena biti “research assistant” (7 godina), prihod je mali, ovisi o mentorovom projektu i niste sigurni kada ćete završiti i što ćete na kraju napraviti.
- Ali, obrazovanje rezultira s vrlo sposobnim inženjerima koji se onda pojavljuju kao leaderi u tehnološkim područjima.
- U oba slučaja motivacija je „**moramo biti prvi i najbolji**”.



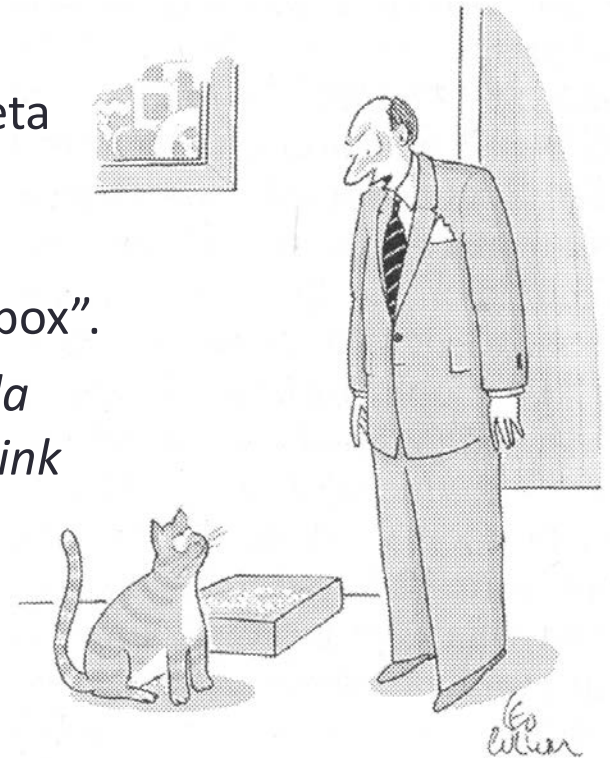
Dva tipa studenata

Na doktorskom studiju se pojavljuju dva tipa studenata:

- direktno s diplomskog na poslijediplomski studij:
 - DOBRO: postoji kontinuitet znanja, studentski život, fokus na istraživanje
 - LOŠE: „završavanje” projekta je strana riječ, teško je procijeniti što je ostvarivo, a što nije.
- Otišli u industriju i vratili se da bi magistrirali ili doktorirali
 - DOBRO: bolje procijenjuju što se može napraviti i da li je to isplativo
 - LOŠE: navikli na lagodan život (\$\$\$, rad 9-5, prihod pada za 3x), teško se vratiti u mod učenja i fokusa na tehnički problem.
- Raditi doktorat zbog veće plaće nije isplativo. Veća plaća teško nadoknadi prihod koji bi ostvarili da su ostali u industriji, ali se s doktoratom otvaraju mnoge druge mogućnosti - lakše se dobivaju se vodeće tehničke pozicije u poduzećima.
- U oba slučaja ljudi završavaju i daju rezultate, ali to zahtijeva različitu žrtvu.

Utisci s doktorskog studija na UCSB-u

- Profesori su fokusirani na istraživanje, kvaliteta nastave je sekundarna. Prednost FERa veća kvaliteta nastave.
- Od studenata se očekuje da sami riješavaju svoje probleme kritičko mišljenje i da misle „out of the box”.
- *Odgovor na moje pitanje mentoru: Što bi mi mogla biti tema doktorata, bio je: „You’re a smart guy, think of something”.*



“Never, ever, think outside the box.”

Što nakon doktorata?

- Svi doktoranti odlaze u industriju ili na profesorske pozicije na druge fakultete, u EU ili u svijetu.
- Postati profesor na fakultetu na kojem ste doktorirali u SADu je skoro nemoguće.
 - Povratak iz industrije na profesorsko mjesto je težak jer fakultet prednjači pred industrijom.
 - Iznimaka ima jer neke industrije prednjače pred fakultetima (solarna tehnologija, plavi laser, LED tehnologija)
- Studenti su mobilni: došli su iz druge države ili drugog grada na studij i kada završe očekuju da će se odseliti.



Kako i kada se zapošljavaju profesori?

Privreda treba inženjere/znanstvenike, a od sveučilišta se traži da predvodi tehnološki napredak.

- Nove znanstvenike i stručnjake moraju obrazovati **najbolji znanstvenici**.
- Fakultetska istraživanja su ta koja potiču razvoj tehnologije, i to tako da profesori i istraživači otvaraju nova područja istraživanja i predvode taj brzi rast.
- Novi profesor treba donijeti nešto novo na fakultet: novu tehnologiju koja je ili će biti relevantna u budućnosti, novce za financiranje tog novog razvoja.
- Natječu se ljudi iz cijelog svijeta (IEEE Spectrum)

Kriteriji:

- Impresivan CV („you have to impress some important people”).
- Leader u relevantnoj tehnologiji, sposobnost financiranja i privlačenja studenata.
- Može direktno s doktorata ili iz istraživačkih institucija.



IEEE Spectrum – oglasi za profesorska mjesta

ShanghaiTech University Faculty Search

The newly launched ShanghaiTech University invites highly qualified candidates to fill multiple tenure-track/tenured faculty positions as its core team in the School of Information Science and Technology (SIST). Candidates should have exceptional academic records or demonstrate strong potential in cutting-edge research areas of information science and technology. They must be fluent in English. Overseas academic connection or background is highly desired. ShanghaiTech is built as a world-class research university for training future generations of scientists, entrepreneurs, and technological leaders. Located in Zhangjiang High-Tech Park in the cosmopolitan Shanghai, ShanghaiTech is ready to trail-blaze a new education system in China. Besides establishing and maintaining a world-class research profile, faculty candidates are also expected to contribute substantially to graduate and undergraduate education within the school.



Academic Disciplines:

We seek candidates in all cutting edge areas of information science and technology. Our recruitment focus includes, but is not limited to: computer architecture and technologies, nano-scale electronics, high speed and RF circuits, intelligent and integrated signal processing systems, computational foundations, big data, data mining, visualization, computer vision, bio-computing, smart energy/power devices and systems, next-generation networking, as well as inter-disciplinary areas involving information science and technology.

Compensation and Benefits:

Salary and startup fund... We also offer a comprehensive benefits. All regular ShanghaiTech employees with international practice...

Qualifications:

- A detailed research plan
- Ph.D. (Electrical Engineering)
- A minimum relevant research experience

Applications:

Submit (in English, PDF format) your curriculum vitae, publications, and name of your referees. For more information, please contact...



THE CHINESE UNIVERSITY OF HONG KONG

Applications are invited for:

Department of Computer Science and Engineering Professors / Associate Professors / Assistant Professors (Ref. 1415/078(370)/2)

The Department invites applications for Professorships / Associate Professorships / Assistant Professorships in computer engineering to pursue new strategic research initiatives, to fill faculty openings within current strengths and to teach in the new curriculum. The Department is looking for a leader and a couple of young and aspiring professors for added momentum to its Computer Engineering Programme, and in particular, talents in the following areas:

- advanced architectural and 3D chip design for energy efficient computing; and
- hardware security for cloud computing.

Applicants should have (i) a PhD degree; and (ii) a good scholarly record demonstrating potential for teaching and research excellence. The appointees will (a) teach both undergraduate and postgraduate courses; (b) develop a significant independent research programme with external funding; and (c) supervise postgraduate students. Appointments will normally be made on contract basis for two to three years initially commencing August 2015, which, subject to performance and mutual agreement, may lead to longer-term appointment or substantiation later. Applications will be accepted until the posts are filled.

Salary and Fringe Benefits

Salary will be highly competitive, commensurate with qualifications and experience. The University offers a comprehensive fringe benefit package, including medical care, plus a contract-end gratuity for appointments of two years or longer, and housing benefits for eligible appointees. Further information about the University and the general terms of service for appointments is available at <http://www.per.cuhk.edu.hk>. The terms mentioned herein are for reference only and are subject to revision by the University.

Application Procedure

Please send full resume, copies of academic credentials, publication list with abstracts of selected published papers, details of courses taught and evaluation results (if any), a research plan and a teaching statement, together with names of three to five referees to the Dean of Engineering by e-mail to recruit@erg.cuhk.edu.hk. Applicants should mark clearly the area(s) of their interests. The Personal Information Collection Statement will be provided upon request. Please quote the reference number and mark 'Application – Confidential' on cover.



Faculty Position in ECE

Michigan State University Department of Electrical and Computer Engineering <http://www.egr.msu.edu/egr/>

The Department of Electrical and Computer Engineering (ECE) at Michigan State University invites applications for an open rank, tenure-system/tenured faculty position. The department seeks exceptional candidates with established records of excellence in the area of Integrated Circuits and Systems, especially Low Power, Mixed-signal and RF design, and Biomedical applications. The successful candidate will be expected to collaborate with colleagues within the College of Engineering and across other colleges for interdisciplinary projects. Candidates at all ranks will be considered. The appointment starts in August 2015. Candidates should have a Ph.D. in Engineering or a closely related field with evidence of research accomplishments, teaching skills, and ability to work effectively with other researchers.

ECE Department has 48 tenure system faculty members, including two National Academy of Engineering members, and 13 NSF CAREER awardees.

The department offers research programs in all major areas of computer engineering, with annual research expenditures exceeding \$10 million. The Department are leading several federal research programs, including the NSF Science and Technology Center for the Fraunhofer Center for Coatings and Nanotechnology. The department has accredited B.S. degree programs in Electrical and Computer Engineering, and approximately 260 full-time graduate students.

For additional information about the Department of Engineering or MSU, see: <http://www.msu.edu>

enjoys a park-like campus with outstanding views of the capital city of Lansing. The Lansing metropolitan area has a diverse population of approximately 4 million people, excellent school systems and places Michigan State University is pro-active in providing dual career couples, benefits, and information about WorkLife Balance. Information about WorkLife Balance can be found at <http://www.msu.edu>.

Candidates should submit a cover letter, curriculum vitae, and at least three references, and statements of interest for this position through <http://www.egr.msu.edu> using #0570 (PDF files are preferred) on a continuing basis until the positions are filled. Applications will begin on February 1, 2015. Applications are welcome by contacting the department at egr-search@egr.msu.edu.

Michigan State University is an affirmative-action, equal opportunity institution committed to achieving excellence through an inclusive culture that encourages diversity. The university actively seeks and nominates women, persons with disabilities, and persons of diverse backgrounds.

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UNIVERSITY OF AGDER

University of Agder offers more than 150 study programs and has active and leading research groups. The ability to show respect, openness, commitment and pride over own and others results is emphasized. UIA has more than 10,000 students and 1,000 staff members at two campuses in Kristiansand and Grimstad.

PERMANENT POSITION, PROFESSOR / ASSOCIATE PROFESSOR IN ROBOTICS

Salary range: 509,100-895,800 NOK (67,000-117,500€) in addition to the Norwegian State pension scheme. Minimum 5 weeks paid vacation.

UIA is searching for candidates with experience in:

- Industry cooperations
- Leading large research projects
- Applying advanced robotics in applications
- Publications in top journals and conferences

Good communication skills (English or Scandinavian languages) are a plus. The successful candidate is expected to lead a research group.

For more information, please contact the recruitment office at recruitment@uia.no. Application should be sent to recruitment@uia.no with details of the position.



TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology



FAKULTÄT FÜR ELEKTROTECHNIK UND INFORMATIONSTECHNIK
Faculty of Electrical Engineering and Information Technology

Technische Universität Wien, Fakultät für Elektrotechnik & Informationstechnik, invites applications for the faculty position of a

FULL PROFESSOR for MICRO-and NANOSENSORS

at the Institut für Sensor- und Aktuatorssysteme (<http://www.isas.tuwien.ac.at>) which provides state-of-the-art silicon micro-technology and participates in the Zentrum für Mikro- und Nanostrukturen (<http://zmn.tuwien.ac.at>). Candidates should have an excellent scientific background and strong expertise in at least one of the following research areas: novel integrated sensor concepts, novel sensing principles for physical and chemical quantities, lab-on chip, technology of micro- and nanofabricated sensors, micro- and nanofabricated energy systems. More information concerning this position is available at <http://etit.tuwien.ac.at/fakultaet/offene-stellen-open-positions/>

Applications are expected until October 20th 2014 and should be sent along with a scientific CV and list of publication to the Dean of the Fakultät für Elektrotechnik und Informationstechnik, Technische Universität Wien, Dekanatszentrum Erzhherzog Johann -Platz, Gusshausstrasse 30/4, A-1040 Wien.



Kratak zaključak

- Stjecanje doktorata u Americi nije posao, već potraga (koja srećom ima kraj 😊)
- Mnogo novaca već investirano u opremu i infrastrukturu za razvoj visoke tehnologije, ono što mi tek moramo ostvariti.
- Obrazovanje inženjera mora biti usklađeno s očekivanjima svjetske industrije jer je tržište rada za buduće inženjere cijeli svijet, a ne samo Hrvatska.
- Konkurencija u kvaliteti i broju visoko obrazovanih inženjera je ogromna (natječemo se s Kinom i Indijom)
- Studente trebamo naučiti da sami rješavaju svoje probleme tako da idu dalje od ustaljenih putova.
- Omogućiti da se profesori (predavači) biraju među najboljim svjetskim stručnjacima.



Hvala na pažnji

