Ahmed T. El-Thakeb Naguib Youssef

Department of Electrical and Computer Engineering
University of California, San Diego (UCSD)
UCSD VLSI-CAD Laboratory

E-mail: a1yousse@eng.ucsd.edu
Mobile: (+1) 858-247-9539

Education and Academic Records

Sep. 2016 – Present
- **PhD.: University of California, San Diego (UCSD).**
  Electrical and Computer Engineering
  Cumulative grade: 'A' – GPA: 4.0/4.0
  VLSI-CAD Lab, Advisor: Prof. Andrew Kahng

Sep. 2012 – April. 2015
- **M.Sc.: The American University in Cairo (AUC), Cairo, Egypt.**
  Electrical and Computer Engineering
  Cumulative grade: 'A' – GPA: 4.0/4.0
  Thesis: Nano-scale FinFETs: TCAD Simulation, Modeling, and Analysis.
  Advisors: Prof. Hamdy Abd El-Hamid and Prof. Yehea Ismail, Fellow IEEE.

Sep. 2007 – July 2012
- **B.Sc.: Cairo University, Cairo, Egypt.**
  Electronics and Electrical Communications Engineering
  Senior Year (2011/2012) → Distinction (88.5%) (12^{th} /300 class)
  Junior Year (2010/2011) → Distinction (88.7%) (14^{th} /300 class)
  Graduation Project: Modeling & CMOS Readout Electronics Design for MEMS-based Infrared Imaging Sensor, grade: Distinction (>85%)

Research Interests

- 3D VLSI Design Space - 3D Power Delivery Networks - Physical Design - EDA
- Computational Methods and Optimization Algorithms.
- Emerging Memory Technologies and Novel Architectures.
- Impact of Novel Devices on Circuit Design Methodologies.
- Neuroelectronics, Biosensors & Wearable Electronics.

Research Experience

- **Research Assistant,** University of California, San Diego, ECE. **May 2015 – Aug. 2016**

Integrated Electronics and Bio-Interfaces Lab, **Projects**:

- Novel Monolithic Integration of Self-powered Wearable Systems
  - Developed a system level model for the overall wearable system including the MOSFET devices along with the solar cell based on the experimental data which helped in assessing the overall functionality of the system by defining the process/design constraints and the impact of different loss mechanisms on the overall performance.
  - Developed optimization algorithm that results in efficient anti-reflective coating stack for fabricated solar cells that improved the efficiency by ~23% (12.9 --> 15.9 %) to be integrated within the wearable system for energy harvesting.

- Modeling Electro-Neural Interfaces
  - Developed electrical model for electro-neural interface that consists of three stages; i) the neural cell membrane, ii) the electrolyte/electrode interface, and iii) the sensing low noise amplifier.
  - Signal processing of electrophysiological measurements by constructing a transfer function based on the developed electrical model, which is used in a deconvolution algorithm to reconstruct the actual recorded action potentials.
  - **Achievement**: Co-authored a multi-disciplinary paper about developing Novel Neural Electrodes for Intracellular recordings submitted to **Nature Comm.**, Sep. 2016 (Under review process). In addition, presenting the results of the electrical model and the signal processing algorithm in **PCSI 43rd Conference**, Jan 2016, CA, USA.

- **International Scholar** (Intern) at IMEC, Belgium. **Jan. 2015 – April 2015**

  Project: Exploring Resistive Switching Memories (ReRAM) - Enabling extended range C-AFM characterization

  - Characterized new low noise amplifier (LNA) with extended dynamic range through switching between multiple linear amplifiers and interfaced with AFM environment.
  - Developed multiple LabVIEW interfaces that acquire the output signal of the AFM, control the switching operation of the LNA, perform additional signal processing, and display the results.

    Interface (a): responsible for acquiring and controlling the scanning mode of the C-AFM.

    Interface (b): responsible for acquiring and controlling the IV sweep contact mode of the C-AFM.
  - **Achievement**: acquiring, for the first time, complete operation cycles (up to 100's of µAs) of ReRAMs at extremely scaled dimensions using this extended range C-AFM environment that was mostly clipped by the conventional environment at around 1µA. (the results are published in a co-authored paper in APL, 2016)

- **Visiting Graduate Researcher** at the Microelectronics Lab. Université Catholique de Louvain (UCL), Belgium. **Aug. 2014 – Oct. 2014**

  Project: Developing and optimizing new circuit design methodologies for low power SRAM cells.

  - On the circuit level, the dynamic read stability of 28nm FDSOI SRAM was quantitatively studied, for the first time, showing the evolution from the static noise margin (SNM) to the dynamic (DNM) through cumulative dynamic effects.
  - On the device level, experimental characterization of silicon nanowires was carried out.
  - **Achievement:** new design insights were deduced from such results that were articulated in a paper published in the International Symposium on Circuits and Systems (ISCAS, IEEE), May 2015.
- **Research Assistant**, Center of Nano-electronics & Devices, Zewail City of Science & Technology, Egypt.

  Sep. 2012 – Dec. 2014
- **Graduate Student Researcher**, Electronics Engineering Department, the American University in Cairo (AUC), Egypt.

  Sep. 2012 – Dec. 2014

Publications

- **[J1] Ahmed T. El-Thakeb,** Hamdy Abd El-Hamid, Yehea Ismail, "Scaling of TG-FinFETs: 3-D Monte Carlo Simulations in the Ballistic and Quasi-Ballistic Regimes," ***IEEE Trans. Electron Devices***, vol. 62, no. 6, April, 2015.
- **[J2]** Y. Hou, U. Celano, L. Goux, L. Liu, A. Fantini, R. Degraeve, **Ahmed T. El-Thakeb**, X. Zheng, Y. Cheng, J. Kang, M. Jurczak, W. Vandervorst "Sub-10 nm Low Current Resistive Switching Behavior in Hafnium Oxide Stack," ***Appl. Phys. Lett.***, 108, Mar. 2016.
- **[J3] Ahmed T. El-Thakeb,** Hamdy Abd El-Hamid, Yehia Ghallab, Yehea Ismail, "Towards Accurate Transport Models for Nanoscale Devices", ***Journal Physica Status Solidi***, 2016. (submitted under review)
- **[C1] Ahmed T. El-Thakeb,** Hassan Mostafa, Hamdy Abd El-Hamid, Yehea Ismail, **"**Performance Evaluation of FinFET-Based SRAM Cell with Technology Scaling Under Statistical V_T Variability,**"** i*n* ***Proc. 26th Int. Conf. Microelectronics (ICM)***, Dec. 2014, pp. 88–91.
- **[C2] Ahmed T. El-Thakeb**, Thomas Haine, Denis Flandre, Yehea Ismail, Hamdy Abd El Hamid, David Bol, "Analysis and Optimization for Dynamic Read Stability in 28nm SRAM Bitcells" in ***IEEE ISCAS***, p. 1414-1417, May 2015.
- **[C3 - Presentation] Ahmed T. El-Thakeb**, Renjie Chen, Ren Liu, Sang Heon Lee, Massoud L. Khraiche, Sandy Hinckley, Yoontae Hwang, Atsunori Tanaka, Yun Goo Ro, Anne Bang, and Shadi A. Dayeh "Probing Human Pluripotent Stem Cell Neurons: **Electrical Modeling and Physiological Measurements**", PCSI-43rd, CA, USA, Jan. 2016.
- **[C4 - Presentation] Ahmed T. El-Thakeb,** Yun Goo Ro, Namseok Park, Cooper Levy, James F. Buckwalter and Shadi Dayeh, "Compact High-Performance Integrated Wearable Electronics with Energy Harvesting**",** 58th Electronic Materials Conference, Newark, DE, USA, June 2016.

Honors

- **Jacobs School of Engineering Graduate Fellowship**, University of California San Diego (UCSD) Mar. **2015**
- **KU Leuven Scholarship**, Katholic University of Leuven, Belgium. Dec. **2014**
- **Certificate of Honor,** American University in Cairo (AUC) for excellent academic standing and highest GPA (4.0/4.0). **2014**
- **Travel Grant of $ 2225.00 USD**, American University in Cairo (AUC), to study abroad in summer. **2014**
- **Research Assistantship,** Zewail City of Science and Technology. **2012, 2013, 2014**
- **Annually Financial Gift,** Cairo University, for students with excellent academic standing. **2010, 2011, 2012**
- **Certificate of Honor,** Giza Government, Egypt**,** for being ranked Top Ten (8^{th} /540) students in the secondary school. **2007**

Technical Skills and Background

- **Simulation Packages**: TCAD Sentaurus, Synopsys – COMSOL, Multi-physics – Q3D, EM – and SPICE/Cadence.
- **Programming Languages**: MATLAB, LabVIEW, VHDL, Linux Environment, Python, and C/ C++.
- **Signal Processing**: Electrical Modeling, Deconvolution Algorithms, Signal conditioning, and Statistical Analysis.
- **Device/Material Characterization**: MOSFET Process, Atomic Force Microscopy (AFM), SC Device Analyzer, SEM.
- **Relevant classes**: Data Structures, Embedded Systems, Numerical Analysis, Computational Methods (‘A’, AUC).Advanced Solid State Device Physics I & II (‘A’, UCSD, AUC), Nano materials for energy conversion and storage (‘A’, AUC),

Teaching & Extracurricular Activities

- Teaching Assistant, ECE Department, UC San Diego. **Fall 2016**
- Student Member in the Center for Design Enabled Nanofabrication (C-DEN), Berkeley UCLA UCSD. http://cden.ucsd.edu/index.php **Oct.2016-Present**
- Volunteering for giving technical Sessions and consultations for Sentaurus Device Simulations for fresh graduate students at AUC, and UCSD. **(3 sessions) 2014 – Present**
- Member in Club of Electronics and Communications Engineering (CECE) student activity, Cairo university branch. We were responsible for first year student’s summer training. **2011**

Personal Data

- Date of Birth : 01/01/1991. - Nationality: Egyptian - Languages: English & Arabic.