HASAN GOKTAS

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Education:

The George Washington University, Washington, DC
PhD, Electrical and Computer Engineering, January 2015 (GPA: 3.7/4)
Dissertation: Design, Fabrication and Characterization of CMOS-MEMS Novel Resonator with an Embedded Heater for Filter, Temperature Sensor and Biosensor Applications.

The George Washington University, Washington, DC
Master of Science, Electrical and Computer Engineering, May 2010 (GPA: 3.67/4)

Izmir Institute of Technology (IZTECH), Izmir, Turkey
Bachelor of Science, Mechanical Engineering, June 2006 (GPA: 3.17/4)

Work Experience:

Research Interests: CMOS MEMS/NEMS devices, Nanoelectronics, Microfabrication, photonic and plasmonic devices, RF/Analog and Digital VLSI Circuits.

- Assistant Professor in Electrical & Electronic Engineering at Harran University Feb. 2016 - Present
- Postdoctoral Researcher ECE at the George Washington University Feb. 2015 - Dec. 2015
  - Designing, fabricating and testing graphene electro optic modulators, switches, and tunable THz graphene antenna in addition to mentoring undergrad and grad students.
- Graduate Teaching Assistant at the George Washington University Jan. 2012 - Jan. 2015
  - Designing high sensitive portable biosensor with mixed signal circuit and package. It was sponsored by ARL (Army Research Lab – USA)
- Graduate Research Assistant at the George Washington University July 2012 - October 2012
  - Designing high temperature CMOS compatible Microhotplate over 700 Celsius for multi array gas sensor with mixed signal circuit and sponsored by Alpha Sense
- ECE Lab. Staff at the George Washington University May 2010 - Dec. 2011
- Mech Eng. at IPI Hitachi and Hyundai air conditioner distributor of Turkey Sept. 2006 - March 2007

Refereed Journals:

1) Fikri Serdar Gokhan, **Hasan Göktaş**, "Analytical approach to calculate the gain of Brillouin fiber Amplifiers in the regime of pump depletion" ***OSA Applied Optics*** *Under Review*
2) **Hasan Göktaş**, "Towards Ultra-Sensitive Temperature Sensor for Uncooled Infrared Sensing in CMOS-MEMS Technology" **MDPI Micromachines, Feb. 2019**, **(Special Edition)** ***(SCIE) (IF=2.22)***
3) **H. Göktaş**, F. Serdar, V. J. Sorger, "Electrical-driven Plasmon Source on Silicon based on Quantum Tunneling" **ACS Photonics, Nov. 2018** ***(SCIE) (IF=6.88)***
4) Fikri Serdar Gokhan, **Hasan Göktaş,** Volker J. Sorger, "Analytical approach of Brillouin amplification over threshold" **OSA Applied Optics, Feb. 2018** ***(SCI) (IF=1.79)***
5) **Hasan Göktaş,** "Design and Characterization Methodology for Efficient Wide Range Tunable MEMS Filters", **JoVE, Feb. 2018 (Invited Paper)** ***(SCIE) (IF=1.23)***
6) **Hasan Göktaş**, Kimberly Turner and Mona Zaghloul, "Enhancement in CMOS-MEMS Resonator for High Sensitive Temperature Sensing" **IEEE Sensors Journal, Feb. 2017** ***(SCIE) (IF=2.62)***
7) **Hasan Göktaş,** Mona Zaghloul, "The Implementation of Low Power and Wide Tuning Range MEMS filters for Communication Applications", **Radio Science, October 2016 (Special Edition)** ***(SCI) (IF=1.42)***
8) **Hasan Goktas** and Mona Zaghloul, "Tuning In-Plane Fixed-Fixed Beam Resonators with Embedded Heater in CMOS Technology**" IEEE Electron Device Letters, Feb. 2015**. ***(SCI) (IF= 3.43)***

9) **Hasan Goktas,** Volker J. Sorger, "Electroluminescence Enhancement via Grating on a Si-based Plasmonic Metal-Insulator-Semiconductor Tunnel Junction", ***(ESCI)*** **MRS Advances**, **December 2015**

Original Contribution (Journals in Submission)

1) **Hasan Göktaş**, Volker J. Sorger, "A wide-range and low power tunable reconfigurable graphene-based THz Antenna"
2) **Hasan Göktaş, "**Ultra-Sensitive portable biosensors via novel MEMS devices"
3) **Hasan Göktaş,** "Forcing the limits in bio/gas sensing in CMOS-MEMS technology"

Conference Papers and Proceedings:

1) Volker J Sorger, Hasan Göktaş, Fikri Serdar Gokhan, Rishi Maiti, "Electrical-Driven Light Emitting Tunnel Juntion", **ITQW2019** Under Review
2) **Hasan Göktaş,** Fikri Serdar Gokhan**,** Volker J. Sorger "Electrical-driven plasmon source on silicon based on quantum tunneling" **Proceeding of SPIE, Quantum Nanophotonics, Vol. 10734, Sep. 2018**
3) **Hasan Göktaş,** Fikri Serdar Gokhan**,** Volker J. Sorger "Inelastic-scattering tunnel electrons towards an electrically driven single-photon light source" **Proceeding of SPIE, Quantum Nanophotonics, Vol. 10359, Sep. 2017**
4) **Hasan Goktas** and Volker J. Sorger, "A Tunnel Junction On-Chip Light Source", **OSA Advanced Photonics 2016, July 2016**
5) **Hasan Goktas,** and Volker J. Sorger, "Sub-Wavelength Si-based Plasmonic Light Emitting Tunnel Junction", **Proceeding of SPIE, Micro+Nano Materials, Devices and Systems, Vol. 9668, December 2015**
6) **Hasan Goktas** and Mona Zaghloul, "CMOS-MEMS Novel Resonator for filter Tuning" **IEEE 58th International Midwest Symposium on Circuits and Systems, August 2015**
7) **Hasan Goktas**, and Mona Zaghloul, "Tuning CMOS-MEMS Resonators with Embedded Heater" 1st **URSI Atlantic Radio Science Conference (URSI AT-RASC)**, Gran Canaria, Spain, May 18-22, **2015**
8) **Hasan Goktas** and Mona Zaghloul, "High Sensitivity CMOS Portable Biosensor with Flexible Microfluidic Integration" **SENSORS 2013, IEEE**
9) **Hasan Goktas** and Mona Zaghloul, "The Novel Microhotplate: A Design Featuring Ultra High Temperature, Ultra Low Thermal Stress, Low Power Consumption and Small Response Time", The 17th International Conference on Sensor Technologies and Applications, **SENSORCOMM 2013**
10) Kenan Cole, **Hasan Goktas**, Omar Gilani et all. Robotic Arm for Interactive Learning – 2011 **ASME Mechanism and Robotic Design Competition Graduate Robot Division Third Place Award**.

Grants and Research Support:

1) Highly sensitive portable MEMS biosensor (**PI**), Scientific Research Project Foundation of Turkey **(55K US$),** May 2018,
2) **186K US$** FPGA software support given by Intel for my MEMS/NEMS and VLSI Lab, Feb 2018.

Awards:

- 2nd place in GWU OTT Open House & Innovation Competition 2014
- 3rd place in GWU SEAS R&D showcase 2014
- 2011 ASME Student Mechanism and Robot Design Competition Graduate Robot Division Third Place
- Full Scholarship from Ministry of National Education, The Republic of Turkey - 2007
  - One of 500 people from all academic fields selected for graduate education abroad

Patents:

- Mona E. Zaghloul, Hasan Goktas, (Provisional patent _ Application No: 61/939,929)
- Volker J. Sorger, Hasan Goktas, CMOS compatible Light Emitting Tunnel Junction (LETJ) (Provisional patent _ Application No: 62/846,041)

Review Activities:

- IEEE Sensors Journal 2015, 2016, 2018
- Journal of Applied Physics 2017
- ERA.Net RUS Plus (EU and Russia) projects review 2017

Qualifications and Skills:

Designing Devices for Optics and Photonics

- Modeling, fabricating, simulating and optimizing with Lumerical and Matlab

Designing MEMS Devices

- Modeling, fabricating, simulating and optimizing the MEMS structures by using CoventorWare, Comsol, Silvaco, Ansys HFSS 15, ADS 2011.05 and Cadence Virtuoso 6.1.5 that includes S parameter analyses and Matlab verification

Microfabrication

- Creating Layout/Mask by using Tanner L-Edit, Cadence Virtuoso 6.1.5, AutoCAD and fabrication experience with CMOS, Silicon and PZT process.
- Building MEMS/NEMS devices by using Deep Reactive Ion Etching (DRIE), Atomic Layer deposition (ALD), Lithography, Wire bonding, Wet etch, Metal sputtering, Thermal Evaporation, CVC, PZT deposition, Lift off process and Oxygen Plasma

Testing and Characterization

- Testing and verification for graphene patch antenna, electro optic modulator, optical waveguides and LETJ with lock in amplifier, low noise amplifier, tunable laser, Bit error rate test, FTIR, Raman Spectroscopy, spectrometer, Sampling scope and receiver
- Testing and verification of CMOS/MEMS chips with Agilent 16902B Logic Analysis System, Hawlet-Packard 8722D Network Analyzer, Hawlet-Packard 8712ET RF Network Analyzer, Cascade Microtech Summit 9500 Parametric Probe Station, Agilent CXA Signal Analyzer, IR Camera, Polytec MSA-500 Micro System Analyzer and UHF-120 Ultra High Frequency Vibrometer
- Imaging and characterizing CMOS/MEMS samples by using Scanning Electron Microscope (SEM) and Atomic Force Microscopy (AFM)

VLSI and FPGA

- Implementing whole ASIC design flow for Digital VLSI and Mixed-Signal VLSI by using Verilog-HDL, Verilog-A, Cadence Simvision, Synopsys Design Vision, Synopsys TetraMAX ATPG, Synopsys BSD Complier, Cadence Encounter Digital Implementation System, Cadence Virtuoso 6.1.5, Cadence Virtuoso Chip Assembly Router and Cadence Encounter Conformal Low Power
- Designing RF VLSI and Analog VLSI with Schematic, Layout and LVS by using Cadence Virtuoso 6.1.5 and Matlab verification
- Programming with Verilog-HDL, testing and verification with Altera and Xlinix FPGA board

Robotics and Embedded Design

- Modeling in Solidworks, creating Matlab GUI program to control the motor drivers and robot arms including Arduino wireless control
- Designing analog circuit and PCB in MULTISIM and PSPICE with implementation and testing

Projects:

Electrical and Computer Engineering

- **Optics and Photonics (Ongoing researches):** Wide range tunable THz Graphene patch antenna, Graphene electro optic modulator, optical waveguides and on chip low power laser source
- **MEMS Related**: High Sensitive Portable CMOS Biosensor, High speed portable PCR device, A wide range tunable (42%) low power CMOS-MEMS resonator, Ultra-sensitive (0.00035 °C/Hz), low power CMOS-MEMS temperature sensor, RF - MEMS capacitive switch, PIN and PN photodiode, Resonators based on piezoelectric actuation with Piezoresistive sensing and Electrostatic actuation with capacitive sensing, High Temperature Microhotplate, MEMS Accelerometer, MEMS Gyro and Pressure sensor.
- **Embedded Design**: Robotic Arm for Interactive Learning
- **Digital VLSI (ASIC AMI-0.6um):** Power Manager Unit for Low Power ASIC, Floating Point Divider, TinyMIPS Processor, CMOS 8X8 Multiplier
- **Analog and RF VLSI (ASIC AMI-0.6um):** Low Noise Amplifier (LNA), Operational Amplifier
- **FPGA:** Vending Machine, Power Manager Unit for Low Power ASIC
- **Fabricated and tested devices:** A wide range tunable (42%) low power CMOS-MEMS resonator, Ultra-sensitive (0.00035 °C/Hz), low power CMOS-MEMS temperature sensor, CMOS Microhotplate, CMOS 8X8 Multiplier, and Robotic Arm for Interactive Learning

Mechanical Engineering

- **Wind Turbine Blade** with production and testing – Undergraduate thesis
- **Kinematic and Robotic**: Earth Quake robot, Gear and Cam mechanism

Project details are available upon request

Teaching Experience:

- VLSI Design and Simulation (ECE 4140) (Graduate)
- ASIC Design and Testing of VLSI Circuits (ECE 4150) (Graduate)
- Engineering Electronics (ECE 2115) (Undergraduate)
- Circuit Theory I & II (ECE 2110) (Undergraduate)

References:

- Associate Professor, Volker J. Sorger
  Department of Electrical and Computer Engineering, The George Washington University, DC, 20052
  E-mail : sorger@gwu.edu, Phone: (202) 994-7186

- Professor and Fellow of IEEE, Mona E Zaghloul
  Department of Electrical and Computer Engineering, The George Washington University, DC, 20052
  E-mail : zaghloul@gwu.edu, Phone: (202) 994-3772

- Associate Dean of Research and Graduate Studies and Professor, Can Korman
  Department of Electrical and Computer Engineering, The George Washington University, DC, 20052
  E-mail : korman@gwu.edu, Phone: (202) 994-2245

- Professor, Kimberly Turner
  Department of Mechanical and Environmental Engineering, UC Santa Barbara, Santa Barbara, CA, 93106
  E-mail : turner@engineering.ucsb.edu, Phone: (805) 403-7426

- Associate Professor, Shahrokh Ahmadi
  Department of Electrical and Computer Engineering, The George Washington University, DC, 20052
  E-mail : ahmadi@gwu.edu, Phone: (202) 994-4956