

# Murat Tepegöz

Research Assistant

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## Personal Identification

- Date of birth** 08.22.1979 – Eskisehir/Turkey
- Current Position**
- **Research assistant** in Electrical and Electronics Engineering Department (EEE) of Middle East Technical University (METU)
  - **PhD student** in EEE of METU with thesis subject of “A Monolithic Readout Circuit for Large Format Uncooled Infrared Detector Focal Plane Arrays” under supervision of Prof. Tayfun Akin.

## Educational Background

- 2003-?** **PhD in Electrical and Electronics Engineering at METU**  
Thesis Title: A Monolithic Readout Circuit for Large Format Uncooled Infrared Detector Focal Plane Arrays
- 2001-2003** **MS in Electrical and Electronics Engineering at METU**  
CGPA: 3.00  
Thesis Title: A CMOS 64x64 INTEGRATED READOUT CIRCUIT FOR INFRARED PHOTODETECTOR FOCAL PLANE ARRAYS
- 1997.2001** **BS in Electrical and Electronics Engineering at METU**  
CGPA: 3.53/4.00  
Specialization Courses: VLSI, Computer Architecture, MEMS
- 1998.2002** **BS in Computer Engineering at METU**  
CGPA: 3.20/4.00
- 1993.1997** **Anatolian High School of Airplane Engines, Eskisehir-Turkey**  
CGPA: 4.70/5.00 Rank: 1/24  
Education Area: Airplane (turbine) engines (J-79, J-85, F110)

## Work Experience

- Research Assistant** in Electrical and Electronics Engineering Department of Middle East Technical University. 2001 August to present
- Teaching Assistant** of Analog Electronics and Digital Electronics courses and their laboratories in EEE Department of METU. 2001 August to present
- Teaching Assistant** of “Introduction to VLSI Design” course and the laboratory in EEE Department of METU. 2003 August to present
- Administrator** in METU MEMS-VLSI Design Laboratory in EEE Department. In this laboratory, there are 10 unix boxes and more than 15 PCs, using several unix-based CAD tools like Cadence, Synopsys, Coventorware, and MEMSCAP. 2000 August to present
- Undergraduate research assistant** in METU MEMS-VLSI *Research Group* for 3 semesters (1.5 years) under supervision of Assoc. Prof. Dr. Tayfun AKIN. 2000 January to 2001 August
- Summer Practice in TUBITAK Bilten and TUSAS Engine Industry in 2000 summer and 1997 Summer, respectively. 2000 and 1997 summers

## Publication

- ▶ Murat Tepegöz, Tayfun Akin, “A READOUT CIRCUIT FOR QWIP INFRARED DETECTOR ARRAYS USING CURRENT MIRRORING INTEGRATION”, accepted to European Solid State Circuit Conference 2003, Portugal.

## Involved Projects

(Projects still under progress are underlined)

▶ **Readout Circuitry Design for Uncooled Microbolometer Thermal Sensors** (PhD Thesis)

Readout circuits are designed for diode-like and surface micromachined bolometers. I am mainly responsible from the readout circuit design of a large surface micromachined bolometer focal plane array. The ultimate aim of the project is to design and fabricate a 320x240 bolometer FPA with many advanced features like very low noise-equivalent-temperature-difference (NETD), high signal-to-noise ratio, uniformity correction, TEC-less operation, etc. In this project, Cadence IC Design Environment and MATLAB are heavily utilized. At the moment, I am working on analog-to-digital architectures proper for FPAs. This project is being carried by Selim Eminoglu and Murat Tepegöz, and supervised by Assoc. Prof. Dr. Tayfun AKIN.

▶ **64x64 Focal Plane Array for Photovoltaic Infrared Detectors** (MS Thesis)

For photovoltaic infrared sensors, a new readout circuitry, called Current Mirroring Integration, is designed. With this new circuitry, we achieved high injection efficiency, almost perfect linearity, very high output voltage range and lower noise contribution compared to other readout techniques. 128x128 and 64x64 FPAs are designed using AMS 0.8 $\mu$  CMOS process with following properties: 64 fps scan rate, variable integration time, variable gain and high precision dark current cancellation. Until now, high injection efficiency, low noise contribution, large dynamic range properties of the proposed circuit are experimentally proven. A QWIP 64x64 detector array is flip-chip bonded to the readout circuit and the overall structure is proved to be working. At any step of this project, Cadence IC Design Environment is highly utilized. This project is supervised by Assoc. Prof. Dr. Tayfun AKIN.

▶ **Arithmetic Unit Architecture in Ternary Logic**

A new arithmetic unit using ternary logic is designed. Further information about this work will be given partially when requested.

▶ **An Image Generation Setup**

A MC6808 family controller is programmed in order to convert the serial analog output of an infrared camera chip to an image. The data sampling time is optimized and the sampled data is transferred to a computer in order to show the image on the screen. A number of signal processing techniques are applied on the image. The resulting setup is sent to Motorola Design Contest.

▶ **A Web-based Data Process and Store System**

A web-based program, which has moved all the paper works of a company to the virtual environment. Totally 1 MB code is written. The system provides maximum security condition. Java and Active Server Pages (ASP) are extensively used. Windows 2000 Server is used as operating system of server box. Internet Information Server and Microsoft SQL Server are used as internet server and data storage server, respectively. The resulting system is now being used for commercial purposes.

▶ **A Turkish Compiler – Türkçe Programlama Dili**

A new compiler with Turkish keywords and statements is designed. Using this compiler, it is possible to use sub-programs, arrays, define new variable types, and use recursion. The aim of this project is to produce a proper to Turkish syntax compiler in order to be used by secondary school students. During this project, ELI and Java are heavily used.

▶ **Senior Year Project and Other Course Related Projects**

As the senior year project, an intelligent device that can roll a ball to a hole on an inclined surface is designed. The place of the holes and the angle of the inclined surface are unknown. The system is supposed to learn the place of the holes and the angle of the inclined surface and fill the holes with least number of trials.

Undergraduate and graduate course projects are not included in this list.

## Computer Skills

### Programming Languages

**C/C++ generations** (Borland C++ 3-4-5, C++ Builder and Visual C++): Professionally used for more than 8 years.

**Pascal generations** (Borland Pascal 5.5-6-7, Delphi): Used for more than 8 years.

**Java** (JDK 1-1.2-1.3): Used extensively in project entitled "A Web-based Data Process and Store System" on the previous page.

**Assembler** Used for processor/controller programming purposes.

**CGI Script Languages** JavaScript and VBScript are used as the application of Active Server Pages. PHP and Perl are used for personal purposes.

**Other Programming Languages:** Scheme, Lisp, Prolog (Used in course projects only).

### Operating Systems

**Unix** (Solaris 6-7-8): I am working as the administrator of a unix lab of VLSI-MEMS Research Group for more than 3 years.

**Windows NT/2000/XP:** I am the administrator of VLSI-MEMS Research Group student PC lab where Windows XP is used as client and Windows 2000 Advanced Server is used as the server.

**Linux generations** (Mandrake, Redhat, Fedora): I used Linux Mandrake as the alternative operating system to Windows in the same PC lab.

### Design, Modeling and Testing Tools

**VLSI Design Tool** Cadence Integrated Circuit Design Environment – ic4.45 on Austria Microsystems (AMS) design kit (0.8 $\mu$ , 0.35 $\mu$ )

Cadence Integrated Circuit Design Environment – ic5.0 on AMI design kit (0.7 $\mu$ , 0.5 $\mu$ , and 0.3 $\mu$ ). Many standard Cadence tools are used extensively like Virtuoso schematics and layout editor, Verilog-XL digital simulation tool, Affirma analog simulation environment, diva DRC, extraction and LVS tool, Silicon ensemble digital synthesis tool, etc.

**Digital Synthesis Tool** Synopsys (*not used professionally*)

**FPGA Design Tool** Xilinx (*used in electronics courses*)

**Testing Tool** HP-VEE (*used in the test phases of all electronics projects above*)

**Mathematical Modeling and Calculation Tools** MATLAB, MathCAD

## Honours and Awards

- Accepted to the **double major program** with Computer Engineering Department in 1998.
- Taken to the **dean's high honour** list in METU for 6 times
- Awarded with Customer Satisfaction, Enrichment of Design with Extra Futures and Good Use of Engineering in Implementation Awards for senior year project in 2001.
- Ranked 230<sup>th</sup> in the 1<sup>st</sup> step and 403<sup>rd</sup> in the 2<sup>nd</sup> step university entrance examination over 1.5 million in 1997.