

## Prof. BARIŞ BAYRAM

### Personal Information

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### International Researcher IDs

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Publons / Web Of Science ResearcherID: AAZ-9365-2020

ScopusID: 8561492900

Yoksis Researcher ID: 115077

### Education Information

Doctorate, Stanford University, Engineering Faculty, Electrical and Electronics Engineering, United States Of America  
2002 - 2006

Postgraduate, Stanford University, Engineering Faculty, Electrical and Electronics Engineering, United States Of America  
2000 - 2002

Undergraduate, Ihsan Dogramaci Bilkent University, Faculty Of Engineering, Department Of Electrical And Electronics  
Engineering, Turkey 1996 - 2000

### Foreign Languages

English, C1 Advanced

### Research Areas

Electrical and Electronics Engineering, Electronic, Electromagnetic, MEMS, Engineering and Technology

### Academic Titles / Tasks

Professor, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics  
Engineering, 2018 - Continues

Associate Professor, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics  
Engineering, 2014 - 2018

Assistant Professor, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics  
Engineering, 2010 - 2014

Lecturer PhD, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics  
Engineering, 2007 - 2010

Research Assistant, Stanford University, Mühendislik Fakültesi, Elektrik-Elektronik Mühendisliği-Ginztan Laboratuvarı,  
2000 - 2006

## Advising Theses

- BAYRAM B., Design and development of 1-D CMUT array with diamond membrane, Postgraduate, B.KARACAER(Student), 2022
- BAYRAM B., Development and implementation of ultrafast ultrasound imaging, Postgraduate, E.BEGÜM(Student), 2022
- Bayram B., Design and characterization of a MEMS membrane for a fiber optic microphone, Postgraduate, G.CİHAN(Student), 2019
- Bayram B., DESIGN AND DEVELOPMENT OF FIBER OPTIC MEMS MICROPHONEMEASUREMENT SYSTEM, Postgraduate, E.MUHARREM(Student), 2019
- BAYRAM B., Design and implementation of a single slope ADC for digital output cooled infrared readout integrated circuits, Postgraduate, F.AKYÜREK(Student), 2016
- BAYRAM B., Integrated circuit design for annular capacitive micromachined ultrasonic transducer, Postgraduate, Y.KUTLUHAN(Student), 2015
- BAYRAM B., Design and microfabrication of annular concentric capacitive micromachined ultrasonic transducer, Postgraduate, P.SHARIF(Student), 2014
- BAYRAM B., Integrated circuit design for flip-chip bonded capacitive micromachined ultrasonic transducers, Postgraduate, M.MAADI(Student), 2013
- BAYRAM B., Design and verification of diamond based capacitive micromachined ultrasonic transducer, Postgraduate, A.MURAT(Student), 2011
- BAYRAM B., Development and microfabrication of capacitive micromachined ultrasound transducers with diamond membranes, Postgraduate, M.CEZAR(Student), 2011

## Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Design and characterization of a buckling-resistant perforated MEMS membrane under residual stress**  
Bozyigit M. A., Sahin A. B., Bayram B.  
JOURNAL OF MICROMECHANICS AND MICROENGINEERING, vol.30, 2020 (SCI-Expanded)
- II. **Digital output ROIC with single slope ADC for cooled infrared applications**  
Akyurek F., BAYRAM B.  
MICROSYSTEM TECHNOLOGIES-MICRO-AND NANOSYSTEMS-INFORMATION STORAGE AND PROCESSING SYSTEMS, vol.23, no.4, pp.1091-1099, 2017 (SCI-Expanded)
- III. **Radiation impedance study of a capacitive micromachined ultrasonic transducer by finite element analysis**  
BAYRAM B.  
JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA, vol.138, no.2, pp.614-623, 2015 (SCI-Expanded)
- IV. **Custom integrated circuit design for ultrasonic therapeutic CMUT array**  
Maadi M., BAYRAM B.  
MICROSYSTEM TECHNOLOGIES-MICRO-AND NANOSYSTEMS-INFORMATION STORAGE AND PROCESSING SYSTEMS, vol.21, no.4, pp.875-891, 2015 (SCI-Expanded)
- V. **Plasma-activated direct bonding of patterned silicon-on-insulator wafers to diamond-coated wafers under vacuum**  
Can U. I., BAYRAM B.  
DIAMOND AND RELATED MATERIALS, vol.47, pp.53-57, 2014 (SCI-Expanded)
- VI. **Diamond-Based Capacitive Micromachined Ultrasonic Transducers in Immersion**  
Cetin A. M., BAYRAM B.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.60, no.2, pp.414-420, 2013 (SCI-Expanded)
- VII. **Diamond-based capacitive micromachined ultrasonic transducers**  
Bayram B.

DIAMOND AND RELATED MATERIALS, vol.22, pp.6-11, 2012 (SCI-Expanded)

- VIII. **Microfabrication of vacuum-sealed cavities with nanocrystalline and ultrananocrystalline diamond membranes and their characteristics**  
BAYRAM B., Altinoluk H. S.  
DIAMOND AND RELATED MATERIALS, vol.20, no.8, pp.1149-1154, 2011 (SCI-Expanded)
- IX. **Fabrication of SiO<sub>2</sub>-stacked diamond membranes and their characteristics for microelectromechanical applications**  
BAYRAM B.  
DIAMOND AND RELATED MATERIALS, vol.20, no.4, pp.459-463, 2011 (SCI-Expanded)
- X. **Plasma-activated direct bonding of diamond-on-insulator wafers to thermal oxide grown silicon wafers**  
Bayram B., Akar O., Akın T.  
DIAMOND AND RELATED MATERIALS, vol.19, pp.1431-1435, 2010 (SCI-Expanded)
- XI. **Finite element modeling and experimental characterization of crosstalk in 1-D CMUT arrays**  
BAYRAM B., Kupnik M., Yaralioglu C. G., Oralkan O., Ergun A. S., Lin D., Wong S. H., Khuri-Yakub B. T.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.54, no.2, pp.418-430, 2007 (SCI-Expanded)
- XII. **Comparison of conventional and collapsed region operation of capacitive micromachined ultrasonic transducers**  
Huang Y., Haeggstrom E., BAYRAM B., Zhuang X., Ergun A. S., Cheng C., Khuri-Yakub B. T.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.53, no.10, pp.1918-1933, 2006 (SCI-Expanded)
- XIII. **Experimental characterization of collapse-mode CMUT operation**  
Oralkan O., BAYRAM B., Yaralioglu G. G., Ergun A. S., Kupnik M., Yeh D. T., Wygant I. O., Khuri-Yakub B. T.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.53, no.8, pp.1513-1523, 2006 (SCI-Expanded)
- XIV. **Dynamic analysis of capacitive micromachined ultrasonic transducers**  
BAYRAM B., Yaralioglu G., Kupnik M., Ergun A., Oralkan O., Nikoozadeh A., Khuri-Yakub B.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.52, no.12, pp.2270-2275, 2005 (SCI-Expanded)
- XV. **Capacitive micromachined ultrasonic transducer design for high power transmission**  
BAYRAM B., Oralkan O., Ergun A., Haeggstrom E.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.52, no.2, pp.326-339, 2005 (SCI-Expanded)
- XVI. **A new regime for operating capacitive micromachined ultrasonic transducers**  
BAYRAM B., Haeggstrom E., Yaralioglu G., Khuri-Yakub B.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.50, no.9, pp.1184-1190, 2003 (SCI-Expanded)
- XVII. **Calculation and measurement of electromechanical coupling coefficient of capacitive micromachined ultrasonic transducers**  
Yaralioglu G., Ergun A., BAYRAM B., Haeggstrom E., Khuri-Yakub B.  
IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL, vol.50, no.4, pp.449-456, 2003 (SCI-Expanded)

## **Refereed Congress / Symposium Publications in Proceedings**

- I. **Diamond Power Electronics: From 1kV towards 10kV Breakdown Voltage**  
Han Z., Lee H., BAYRAM B., Bayram C.  
2022 Compound Semiconductor Week, CSW 2022, Michigan, United States Of America, 1 - 03 June 2022
- II. **Capacitive micromachined ultrasonic transducer arrays for integrated diagnostic/therapeutic**

## **catheters**

Wong S. H., Wygant I. O., Yeh D. T., Zhuang X., BAYRAM B., Kupnik M., Oralkan O., Ergun A. S., Yaralioglu G. G., Khuri-Yakub B. T.

5th International Symposium on Therapeutic Ultrasound, Massachusetts, United States Of America, 27 - 29 October 2005, vol.829, pp.395-396

### **III. FINITE ELEMENT ANALYSIS OF FABRICATION RELATED THERMAL EFFECTS IN CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCERS**

Kupnik M., Ergun A. S., Yaralioglu G. G., BAYRAM B., Oralkan O., Wong S. H., Lin D., Khuri-Yakub B. T.

IEEE Ultrasonics Symposium, Vancouver, Canada, 3 - 06 October 2006, pp.942-945

### **IV. ACOUSTIC CROSSTALK REDUCTION METHOD FOR CMUT ARRAYS**

BAYRAM B., Yaralioglu G. G., Kupnik M., Khuri-Yakub B. T.

IEEE Ultrasonics Symposium, Vancouver, Canada, 3 - 06 October 2006, pp.590-593

### **V. FINITE ELEMENT ANALYSIS OF CMUTs: CONVENTIONAL VS. COLLAPSE OPERATION MODES**

Yaralioglu G. G., BAYRAM B., Khuri-Yakub B. T.

IEEE Ultrasonics Symposium, Vancouver, Canada, 3 - 06 October 2006, pp.586-589

### **VI. Finite element modeling of capacitive micromachined ultrasonic transducers**

Yaralioglu G., BAYRAM B., Nikoozadeh A., Khuri-Yakub B.

Medical Imaging 2005 Conference, California, United States Of America, 15 - 17 February 2005, vol.5750, pp.77-86

### **VII. Characterization of cross-coupling in capacitive micromachined ultrasonic transducers**

BAYRAM B., Kupnik M., Yaralioglu G., Oralkan O., Lin D., Zhuang X., Ergun A., Sarioglu A., Wong S., Khuri-Yakub B.

IEEE International Ultrasonics Symposium, Rotterdam, Netherlands, 18 - 21 September 2005, pp.601-604

### **VIII. CMUT ring arrays for forward-looking intravascular imaging**

Oralkan Ö., Hansen S. T., Bayram B., Yaralioglu G. G., Ergun A. S., Khuri-Yakub B. T.

2004 IEEE Ultrasonics Symposium, Montreal, Canada, 23 - 27 August 2004, vol.1, pp.403-406

### **IX. Analytical calculation of collapse voltage of CMUT membrane**

Nikoozadeh A., BAYRAM B., Yaralioglu G., Khuri-Yakub B.

IEEE Ultrasonics Symposium, Montreal, Canada, 23 - 27 August 2004, pp.256-259

### **X. High-frequency CMUT arrays for high-resolution medical imaging**

Oralkan O., Hansen S., BAYRAM B., Yaralioglu G., Ergun A., Khuri-Yakub B.

IEEE Ultrasonics Symposium, Montreal, Canada, 23 - 27 August 2004, pp.399-402

### **XI. Dynamic FEM analysis of multiple cMUT cells in immersion**

BAYRAM B., Yaralioglu G., Ergun A., Oralkan O., Khuri-Yakub B.

IEEE Ultrasonics Symposium, Montreal, Canada, 23 - 27 August 2004, pp.252-255

### **XII. CMUT ring arrays for forward-looking intravascular imaging**

Oralkan O., Hansen S., BAYRAM B., Yaralioglu G., Ergun A., Khuri-Yakub B.

IEEE Ultrasonics Symposium, Montreal, Canada, 23 - 27 August 2004, pp.403-406

### **XIII. Dynamic analysis of CMUTs in different regimes of operation**

BAYRAM B., Haeggstrom E., Ergun A., Yaralioglu G., Khuri-Yakub B.

IEEE International Ultrasonics Symposium, Hawaii, United States Of America, 5 - 08 October 2003, pp.481-484

### **XIV. Collapsed regime operation of capacitive micromachined ultrasonic transducers based on wafer-bonding technique**

Huang Y., Haeggstrom E., BAYRAM B., Zhuang X., Ergun A., Cheng C., Khuri-Yakub B.

IEEE International Ultrasonics Symposium, Hawaii, United States Of America, 5 - 08 October 2003, pp.1161-1164

### **XV. Residual stress and Young's modulus measurement of capacitive micromachined ultrasonic transducer membranes**

Yaralioglu G., Ergun A., BAYRAM B., Marentis T., Khuri-Yakub B.

IEEE International Ultrasonic Symposium, Georgia, United States Of America, 7 - 10 October 2001, pp.953-956

### **XVI. Influence of the electrode size and location on the performance of a CMUT**

BAYRAM B., Yaralioglu G., Ergun A., Khuri-Yakub B.

IEEE International Ultrasonic Symposium, Georgia, United States Of America, 7 - 10 October 2001, pp.949-952

## Supported Projects

- BAYRAM B., ÖZMEN G. C., Project Supported by Higher Education Institutions, Fiber optik MEMS mikrofonların tasarımı ve karakterizasyonu, 2018 - 2019
- Bayram B., TÜBİTAK Project, Özgün Mems Mikrofonların Geliştirilmesi, 2016 - 2019
- BAYRAM B., Project Supported by Higher Education Institutions, MEMS kapasitif ultrasonik çevirgeçlerin sonlu elemanlar yöntemi yardımıyla tasarımı ve simülasyonunun yapılması, 2016 - 2016
- BAYRAM B., Project Supported by Higher Education Institutions, Pulların Moleküler Bağ Metoduyla Birleştirilmesi Metodunun Elmas MEMS Uygulamalarına Yönelik Geliştirilmesi, 2015 - 2015
- BAYRAM B., Project Supported by Higher Education Institutions, Elmas Membranlı Kapasitif Ultrason Çevirgeç Dizilerinin Mikroüretimi, 2014 - 2014
- BAYRAM B., Sharif P., Project Supported by Higher Education Institutions, 2-D Elmas Membranlı Tedavi Amaçlı Mikroüretilmiş Kapasitif Ultrason Çevirgeç Dizilerinin Mikroüretimi, 2013 - 2013
- BAYRAM B., Project Supported by Higher Education Institutions, 2-D Elmas Tabanlı Kapasitif Mikroüretilmiş Ultrasonik Çevirgeçlere Yönelik Özgün Entegre Devre Tasarımı Ve Karakterizasyonu, 2012 - 2012
- BAYRAM B., Project Supported by Higher Education Institutions, Yüksek Frekanslı Elmas Membranlı Mikroüretilmiş Kapasitif Ultrason Çevirgeçler, 2011 - 2011

## Patent

- Fiber Optic MEMS Microphone, Patent, CHAPTER H Electricity, Standard Registration, 2023
- BAYRAM B., A method for microfabrication of a capacitive micromachined ultrasonic transducer comprising a diamond membrane and a transducer thereof, Patent, CHAPTER H Electricity, Standard Registration, 2015
- BAYRAM B., Bir elmas membran ve bir çevirgeçten oluşan bir kapasitif mikroüretilmiş ultrasonik çevirgecin mikroüretim yöntemi, Patent, CHAPTER H Electricity, Standard Registration, 2014
- BAYRAM B., Method for Microfabrication of a Capacitive Micromachined Ultrasonic Transducer comprising a Diamond Membrane and a Transducer Thereof, Patent, CHAPTER H Electricity, Standard Registration, 2013
- BAYRAM B., Acoustic Crosstalk Reduction Method for CMUTs in Immersion, Patent, CHAPTER H Electricity, Standard Registration, 2010
- BAYRAM B., Method and System for Operating Capacitive Membrane Ultrasonic Transducers, Patent, CHAPTER H Electricity, Standard Registration, 2007

## Metrics

- Publication: 33
- Citation (WoS): 755
- Citation (Scopus): 908
- H-Index (WoS): 13
- H-Index (Scopus): 15

## Awards

- Bayram B., TUBA GEBİP, Tuba, June 2011

## Non Academic Experience

- Stanford University