

# MEHMET AYYILDIZ

## **İstanbul Bilgi University**

### **Department of Mechatronics Engineering**

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## **Research Interests**

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Computational and experimental continuum mechanics: mechanical characterization of soft biological tissues, constitutive modeling and numerical simulation of soft materials, finite element analysis; correlation between mechanical parameters and microstructural features of biological tissues: tactile imaging for detecting breast cancer, mechanics based pathology of liver; Haptics: tactile sensors and displays, haptic feedback on touchscreens, contact mechanics and frictional dynamics of the human finger pad in surface haptics, psychophysical evaluation of human haptic perception.

## **Education**

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### *09/2011 – 03/2015* **Koç University**

*İstanbul, Turkey*

Ph.D. in Mechanical Engineering (GPA: 4.00/4.00)

Thesis: Effects of preservation solution and period on the mechanical and histological properties of liver

Advisor: Prof. Dr. Çağatay Başdoğan

Committee: Prof. Dr. Edoardo Mazza (ETH Zurich)

Prof. Dr. Ingolf Sack (Charité Universitätsmedizin Berlin)

Assoc. Prof. Dr. Demircan Canadınç (Koç University)

Assoc. Prof. Dr. Burak Güçlü (Boğaziçi University)

Assist. Prof. Dr. Evren Samur (Boğaziçi University)

### *09/2009 – 07/2011* **Koç University**

*İstanbul, Turkey*

M.Sc. in Mechanical Engineering (GPA: 3.63/4.00)

Thesis: A novel opto-electro-mechanical tactile sensor for breast cancer imaging

Advisor: Prof. Dr. Çağatay Başdoğan

Committee: Assoc. Prof. Dr. Burak Güçlü (Boğaziçi University)

Assoc. Prof. Dr. Demircan Canadınç (Koç University)

### *09/2005 – 06/2009* **Selçuk University**

*Konya, Turkey*

B.Sc. in Mechanical Engineering (GPA: 3.37/4.00)

## **Appointments**

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### Permanent Positions

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#### *10/2016 – Present* **İstanbul Bilgi University**

*İstanbul, Turkey*

Faculty Member, PhD

#### *01/2016 – 07/2016* **EnginSoft Turkey**

*İstanbul, Turkey*

Technical Manager

#### *05/2015 – 01/2016* **General Electric**

*Gezbe, Turkey*

Design Engineer

09/2009 – 03/2015 **Koç University**  
İstanbul, Turkey Research and Teaching Assistant

#### Visiting Positions

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04/2018 – 05/2018 **Forschungszentrum Jülich**  
Jülich, Germany Visiting Researcher

07/2011 – 09/2011 **Charité Universitätsmedizin**  
Berlin, Germany Visiting Researcher

#### Honors & Awards

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2017 **İstanbul Bilgi University**

Teaching Excellence Award based on 2016-2017 Academic Year Spring Semester Course and Instructor Evaluation Survey (among top 10 instructors at the university)

2017 **İstanbul Bilgi University**

Teaching Excellence Award based on 2016-2017 Academic Year Fall Semester Course and Instructor Evaluation Survey (among top 10 instructors at the university)

2015 **Koç University**

Ranked 1<sup>st</sup> at the Graduate School of Sciences and Engineering (GPA: 4.00/4.00)

2011 – 2015 **Scientific and Technological Research Council of Turkey (TUBITAK)**  
Scholarship for Ph.D. students - BİDEB 2211

2011 – 2015 **Koç University**  
Full scholarship during Ph.D. studies

2010 – 2011 **Scientific and Technological Research Council of Turkey (TUBITAK)**  
Scholarship for M.Sc. students - BİDEB 2210

2009 – 2011 **Koç University**  
Full scholarship during M.Sc. studies

2009 **Selçuk University**  
Ranked 2<sup>nd</sup> in the department (among ~120 students)

2008 **ERASMUS European Exchange Program**  
Scholarship to study at Lublin University of Technology, Poland

#### Project Experience

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2015 – 2016 **Methodology for optimum design of ship silencers**  
Grant: Scientific & Technological Research Council of Turkey, Project No: 7150328  
Role: Project Manager, EnginSoft Turkey

2011 – 2014 **The effect of preservation time of the viscoelastic material properties of liver**  
Grant: Scientific & Technological Research Council of Turkey, Project No: 110M649  
Role: Research Assistant, Koç University

2013 – 2014 **Dynamic mechanical properties and long term deformation behaviour of viscous materials (MeProVisc)**  
Grant: The European Metrology Research Programme (EMRP)  
Role: Research Assistant, Koç University

## Publications

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### Peer Reviewed Journal Articles

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- J.05* **M. Ayyildiz**, S. Cinoglu, C. Basdogan, "Effect of normal compression on the shear modulus of soft tissue in rheological measurements," *Journal of the Mechanical Behavior of Biomedical Materials*, vol. 49, pp. 235-243, Sep, 2015.
- J.04* **M. Ayyildiz**, R. G. Aktas, and C. Basdogan, "Effect of solution and post-mortem time on mechanical and histological properties of liver during cold preservation," *Biorheology*, vol. 51, no. 1, pp. 47-70, Jan, 2014.
- J.03* B. Yarpuzlu, **M. Ayyildiz**, O. E. Tok, R. G. Aktas, and C. Basdogan, "Correlation between the mechanical and histological properties of liver tissue," *Journal of the Mechanical Behavior of Biomedical Materials*, vol. 29, pp. 403-416, Jan, 2014.
- J.02* **M. Ayyildiz**, B. Guclu, M. Z. Yildiz, and C. Basdogan, "An optoelectromechanical tactile sensor for detection of breast lumps," *IEEE Transactions on Haptics*, vol. 6, no. 2, pp. 145-155, Apr-Jun, 2013.
- J.01* **M. Ayyildiz**, B. Yarpuzlu, and C. Basdogan, "Karaciğer dokusunun saklama zamanına ve solüsyonuna bağlı materyal özelliklerinin değişimi," *Sakarya University Journal of Science*, vol. 16, no. 3, pp. 259-267, Jun 2012.

### Peer Reviewed Conference Proceedings

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- P.04* O. Sirin, **M. Ayyildiz**, and C. Basdogan, "Effect of Finger Velocity on Frictional Forces Modulated by Electro vibration," *21<sup>th</sup> National Biomedical Engineering Meeting (BIYOMUT)*, Istanbul, Turkey, 2017.
- P.03* A. Sagdic, **M. Ayyildiz**, and C. Basdogan, "Haptic Perception of 2D Equilateral Geometric Shapes via Electro vibration on Touch Screen," *21<sup>th</sup> National Biomedical Engineering Meeting (BIYOMUT)*, Istanbul, Turkey, 2017.
- P.02* **M. Ayyildiz**, B. Yarpuzlu, and C. Basdogan, "Effect of preservation period on the material properties of liver," *17<sup>th</sup> National Biomedical Engineering Meeting (BIYOMUT)*, Istanbul, Turkey, 2012, pp. 19-25.
- P.01* **M. Ayyildiz**, B. Guclu, M. Z. Yildiz, and C. Basdogan, "A novel tactile sensor for detecting lumps in breast tissue," *EuroHaptics 2010 International Conference on Generating and Perceiving Tangible Sensations*, Part I, Amsterdam, Netherlands, 2010, pp. 367-372.

### Peer Reviewed Conference Abstracts

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- A.06* O. Sirin, **M. Ayyildiz**, and C. Basdogan, "Effect of Sliding Velocity on Frictional Forces Modulated by Electro vibration," *2017 World Haptics Conference, Munich*, Germany, 2017.
- A.05* A. Sadic, **M. Ayyildiz**, and C. Basdogan, "Haptic Perception of 2D Equilateral Geometric Shapes via Electro vibration on Touch Screens," *2017 World Haptics Conference, Munich*, Germany, 2017.
- A.04* E. Büyüktopçu, O. E. Tok, R. G. Aktas, B. Yarpuzlu, **M. Ayyildiz**, and C. Basdogan, "Organ nakilleri öncesi dokuların taşınma sürecinde UW ve Custodiol solüsyonlarında bekleyen karaciğer dokularında zamana bağlı ortaya çıkan değişikliklerin ince yapısal düzeyde incelenmesi," *21<sup>st</sup> National Electron Microscopy Congress, Mersin*, Turkey, 2013.
- A.03* **M. Ayyildiz**, B. Yarpuzlu, and C. Basdogan, "The changes in mechanical properties of liver tissue during the cold ischemic preservation," *5<sup>th</sup> International Conference on Mechanics of Biomaterials and Tissues (ICMOBT)*, Sitges, Spain, 2013.

- A.02 **M. Ayyildiz**, B. Yarpuzlu, and C. Basdogan, "Effect of preservation solution and period on rheological properties of liver," *19<sup>th</sup> Congress of the European Society of Biomechanics (ESB)*, Patras, Greece, 2013.
- A.01 **M. Ayyildiz**, B. Yarpuzlu, and C. Basdogan, "A novel soft tissue slicing apparatus for preparing rheological samples," *19<sup>th</sup> Congress of the European Society of Biomechanics (ESB)*, Patras, Greece, 2013.

#### Workshops, Demonstrations and Seminars

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- W.05 **M. Ayyildiz**, "Biomechanical characterization and modeling of liver tissue," *İstanbul Neuroprosthetics Workshop, Boğaziçi University, İstanbul, Turkey*, 2017.
- W.04 **M. Ayyildiz**, "From mechanical properties to evaluation of transplant organs and detection of diseases: towards a mechanics based histology of soft tissue," *presented at İstanbul Bilgi University, İstanbul, Turkey*, 2016.
- W.03 **M. Ayyildiz**, "Soft Tissue Biomechanics," *presented at İstanbul Medipol University, İstanbul, Turkey*, 2016.
- W.02 S. Cinoglu, **M. Ayyildiz**, C. Basdogan, "Rheological experiments for the characterization of dynamic mechanical properties and long term deformation behaviour of viscous materials," *presented at MeProVisc Workshop - The Istituto Nazionale di Ricerca Metrologica (INRIM)*, Torino, Italy, 2014.
- W.01 **M. Ayyildiz**, B. Guclu, M. Z. Yildiz, and C. Basdogan, "A Tactile Sensor for Detecting Lumps in Breast Tissue," *demonstrated at World Haptics Conference 2011, İstanbul, Turkey*, 2011.

#### Theses

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- T.02 **M. Ayyildiz**, Effect of Preservation Solution and Period on the Mechanical and Histological Properties of Liver, Ph.D. Thesis, *Department of Mechanical Engineering, Koç University*, March 2015.
- T.01 **M. Ayyildiz**, A novel opto-electro-mechanical tactile sensor for breast cancer imaging, M.Sc. Thesis, *Department of Mechanical Engineering, Koç University*, July 2011.

## Professional Activities

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#### Reviewer for Journals

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Medical Engineering & Physics  
 IEEE Transactions on Haptics  
 Journal of the Mechanical Behavior of Biomedical Materials  
 Journal of Biomechanics  
 Cardiovascular Engineering and Technology  
 Computer Methods in Biomechanics and Biomedical Engineering

#### Reviewer for Conferences

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Worldhaptics  
 Eurohaptics  
 International Conference on Biomedical Engineering and Biotechnology  
 International Conference on Information Processing in Computer-Assisted Interventions  
 ToRK

Member

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European Society of Biomechanics  
Technical Committee on Haptics

Other Activities

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Managing Facebook and LinkedIn accounts for IEEE Transactions on Haptics

## **Teaching**

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*10/2016 – Present* **Bilgi University**  
*İstanbul, Turkey* Instructor

### **Course**

MECA 332 Mechatronics Components Design  
MECA 321 Mechanics of Materials  
MECA 300 Summer Practice  
MECA 241 Computer Tools for Mechatronics Engineers  
MECA 211 Engineering Mechanics  
MECA 205 Materials Science for Engineers  
MECA 200 Summer Practice

*09/2009 – 03/2015* **Koç University**  
*İstanbul, Turkey* Teaching Assistant

### **Course**

MECH 491 Mechanical Engineering Design  
MECH 304 Dynamic Modeling and Control  
MECH 303 Machine Design  
MECH 302 Heat Transfer

## **Institutional Roles**

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*10/2017 – Present* ERASMUS Coordinator of the Department

*10/2017 – Present* Student Affairs Committee Member

*04/2017 – Present* Curriculum Committee Member

*04/2017 – Present* Accreditation Coordinator of the Department