

HASAN BÖRKE BİRGİN

EDUCATION:

2018-2022 : Dottorato Di Ricerca in Energia E Sviluppo Sostenibile XXXIV Ciclo,
University of Perugia, Perugia, Italy

2015-2018 : MS, Bogazici University, Istanbul, Turkey - Institute of Graduate Studies in
Science and Engineering, Civil Engineering (GPA: 3,94/4)

2011-2015 : Bogazici University, Istanbul, Turkey (GPA: 3,44/4)
- Civil Engineering (Transfer from Physics)

Fall 2012 : Technische Universität München, Germany (Erasmus Program)

2010-2011 : Bogazici University, Istanbul, Turkey - Physics

2009-2010 : Bogazici University, Istanbul, Turkey - English Prep School

2005-2009 : Österreichisches Sankt Georg Kolleg, Istanbul, Turkey

WORKING EXPERIENCE:

- **November 2018 – November 2021** :
ESR, Marie Sklodowska-Curie Actions: SAFERUP! Project: Nanotechnologies for
Self-sensing & Self-inspecting Smart Urban Pavements, Grant agreement: 765057
- **December 2015 – November 2018** :
Teaching assistant, Dept. of Civil Engineering, Bogazici University
- **September 2014 – November 2014**:
TEM Engineering and Consulting Ltd., Internship
- **September 2013 – May 2014**:
Student assistant, Dept. of Civil Engineering, Bogazici University
- **September 2013**:
Yapi Akademisi Ltd., Internship
- **August 2013**:
Internship (1-month) at ENKA Insaat Berezovskaya Power Plant (Siberia, Russia)
- **March 2013 – May 2013**:
EMAY Insaat Kozyatagi Hilton Hotel, assistant field engineer

Ph.D THESIS:

Development and application of composite pavements with nano- and micro- carbon inclusions for bridge weigh-in-motion (WIM) sensing. Development and characterization of novel self-sensing and self-inspecting smart pavement materials. Development of dedicated hardware and software solutions and vehicle characterization algorithm for smart pavement based WIM system. Field application and verification of newly developed system.

M.S THESIS:

Dynamic modeling of an ORC power system. Modeling of individual components (evaporator, condenser, turbine and pump), determination of heat transfer coefficients instantly according to the state and modeling of the components within the entire ORC system body to simulate transient system output between steady state conditions.

PUBLICATIONS:

- Birgin, H.B.; Laflamme, S.; D'Alessandro, A.; Garcia-Macias, E.; Ubertini, F. A *Weigh-in-Motion Characterization Algorithm for Smart Pavements Based on Conductive Cementitious Materials*. *Sensors* 2020, 20, 659.
<https://doi.org/10.3390/s20030659>
- Birgin, H.B.; D'Alessandro, A.; Laflamme, S.; Ubertini, F. *Smart Graphite–Cement Composite for Roadway-Integrated Weigh-In-Motion Sensing*. *Sensors* 2020, 20, 4518.
<https://doi.org/10.3390/s20164518>
- Birgin, H.B.; D'Alessandro, A.; Laflamme, S.; Ubertini, F. *Hybrid Carbon Microfibers-Graphite Fillers for Piezoresistive Cementitious Composites*. *Sensors* 2021, 21, 518.
<https://doi.org/10.3390/s21020518>
- Birgin H.B., D'Alessandro A., Laflamme S., Ubertini F. (2021) *Graphite-Cement Composites as Low-Cost Strain Sensing Multifunctional Materials*. In: Rizzo P., Milazzo A. (eds) *European Workshop on Structural Health Monitoring. EWSHM 2020. Lecture Notes in Civil Engineering*, vol 127. Springer, Cham.
https://doi.org/10.1007/978-3-030-64594-6_83
- Hasan Borke Birgin, Antonella D'Alessandro, Maurizio Favaro, Cesare Sangiorgi, Simon Laflamme, and Filippo Ubertini "Investigation of a low-cost weigh-in-motion vehicle characterization system", *Proc. SPIE 11785, Multimodal Sensing and Artificial Intelligence: Technologies and Applications II*, 1178505 (20 June 2021).
<https://doi.org/10.1117/12.2593722>
- Birgin, H.B.; D'Alessandro, A.; Laflamme, S.; Ubertini, F. *Innovative Carbon-Doped Composite Pavements with Sensing Capability and Low Environmental Impact for Multifunctional Infrastructures*. *J. Compos. Sci.* 2021, 5, 192.
<https://doi.org/10.3390/jcs5070192>
- D'Alessandro, A., Birgin, H. B., & Ubertini, F. (2021, March). *Advanced Monitoring of Structures and Infrastructures Through Smart Composite Sensors and Systems*. In *International Workshop on Civil Structural Health Monitoring* (pp. 485-498). Springer, Cham.
https://doi.org/10.1007/978-3-030-74258-4_31

CONFERENCE PRESENTATIONS:

- 8th Workshop on Civil Structural Health Monitoring: “*Advanced monitoring of structures and infrastructures through smart composite sensors and systems.*”
- 10th International Conference on Structural Health Monitoring of Intelligent Infrastructure, Advanced Research and Real-world Applications: “*Smart pavement sensor for road-bridges.*”
- SPIE Optical Metrology, Multimodal Sensing and Artificial Intelligence: Technologies and Applications II: “*Investigation of a low-cost weigh-in-motion vehicle characterization system*”

COURSES AND PROJECTS:

- **Undergraduate Thesis:** System Identification via Image Processing
- **CE 546 Advanced Mechanics of Materials**
- **ME 530 Advanced Dynamics**
- **CMPE 462 Machine Learning:** Classification of mode shapes, natural frequencies and damping ratios of a structure in real-time health monitoring
- **ME 537 State Space Control Theory:** Reference tracking with a quadcopter (with known parameters and unknown parameters, adaptive control)
- **ME 561 Conduction Heat Transfer:** Developed finite element code for time dependent heat conduction problem in a solid plane with different heating conditions.
- **EE 550 Artificial Neural Networks:** Hopfield model, regression and classification with multilayer perceptron
- **ME 68B Adaptive Control:** Adaptive active suspension (disturbance estimation and cancellation), extremum seeking and its application in Antilock Breaking System (ABS).
- **ME 551 Advanced Fluid Mechanics:** Developed numerical solutions for boundary layer equations
- **CMPE 565 Autonomous Robots:** Robotics applications with ROS
- **Numerical Modeling and Optimization of Energy Systems** by Dr. Alvaro de Gracia: Numerical modelling using finite volumes and optimization of heat transfer problems.
- **APSS 2019:** The contributions shown below are presented at the end of the course as a group project:
 - Development of finite element model of Annibaldi Bridge, Rome, based on the frame solving algorithm indicated in the section “extracurricular projects”. The optimization of the developed numerical model to approach first four measured natural frequencies of the bridge.
 - Clustering of modeshapes, and, classification according to the structural condition with a small scaled 4-story-frame structure.
- **Special Course on Structural Health Monitoring** by Prof. Laflamme: Case study on San Pietro bell-tower.
- **Special Course on Control of Flexible Structures** by Prof. Halevi: Development of passive control and damper systems for structures.

EXTRACURRICULAR PROJECTS:

- **3D Truss and frame solving algorithm:** Displacement and force time-history analysis for a given ground motion. Combined with extremum seeking optimization and presented in APSS 2019.
- **Source tracking:** Source tracking algorithm utilizing extremum seeking and non-holonomic constraints.
- **Electronic systems development and communications through mobile applications:** MEMS sensors applications and readings, multichannel readings, data communication and post-processing through smart phones, automated vehicle detection by camera.
- **Obstacle avoidance:** Development of obstacle avoidance algorithm and application on the 4-wheels robot frame using ultrasound sensors.

LANGUAGE SKILLS:

Turkish, native speaker

English, academic

German, fluent

Italian, beginner

COMPUTER KNOWLEDGE:

-DS Simulia: Abaqus

-Autodesk: AutoCad

-NI: LabVIEW

-Mathworks: Matlab

-CSI: Etabs, SAP2000

-ROS

-Sta: Sta4-Cad

-C/ C++/ Python/ Swift

SPORTS AND HOBBIES:

American Football: Boğaziçi Sultans

- Outstanding Player Award 2010 Summer Clinic of Turkey
- Champions in Universities League 2012, Turkey

Tennis:

- Champion in the Bogazici University Sports Committee tournament, Istanbul 2016
- Champion in the senior tennis tournament (TTF), Sporium, Istanbul, Akatlar 2016