

# Biomedical Technologies and Innovation Doctoral Programme (BIOTIN)



<b>Title of the PhD Project</b>	<b>Two dimensional materials for sensing applications</b>
<b>Acronym</b>	<b>2DSense</b>
<b>Research Fields of the Project</b>	Nanotechnology, Graphene and Related Materials, Biotechnology
<b>Keywords</b>	Experimental and Theoretical, Sensor, Graphene, Cehmiresistor,
<b>Host Institution, Department and Campus Location</b>	İzmir Institute of Technology, Department of Photonics, Urla-İzmir
<b>PhD Awarding Institution and Graduate Programme</b>	İzmir Institute of Technology, Graduate School, PhD in Photonics Science and Engineering
<b>Name and Affiliation of Main Supervisor</b>	Prof. Hasan Şahin (IZTECH)
<b>Name and Affiliation of Co-supervisors</b>	Assoc. Prof. Bora Garipcan (BOUN) Asst. Prof. Ceyda Öksel Karakuş (IZTCH)
<b>Research Environment and Infrastructure</b>	Theoretical Infrastructure: For theoretical calculations and simulations each student has access to a supercomputer of 32 cpu. License of VASP computing tool. Experimental Infrastructure: Raman spectrometer, UV-vis spectrometer (for photoluminescence, absorption, transmittance), Atomic Force Microscope <a href="https://sahingroup.iyte.edu.tr/">https://sahingroup.iyte.edu.tr/</a>
<b>Scientific Context of the Project</b>	The project 2DSense deals with two-dimensional ultra-thin materials such as graphene. Family of 2D materials with their clean surface and high surface-to-volume ratio provides an efficient playground for sensing applications. In the framework of the project both experimental and theoretical works will be performed.
<b>Brief Workplan</b>	(1 year) Synthesis and characterization of 2D materials. (1 year) Theoretical simulation of electronic and vibrational characteristics of 2D materials. (1 year) Examination of possible 2D materials for the use of a sensor surface (1 year) Computational understanding of sensing mechanism

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	(1 year) Functionalization of 2D material for enhanced functionality  (1 year) Enhancing the sensitivity for biosensing applications
<b>Innovative Aspects of the Project</b>	The project deals with state-of-the-art materials and theoretical approaches to synthesize and understand the novel sensor types.
<b>Training Opportunities of the Project</b>	Student will have opportunity to have training on background on computational tools for computation of structural, electronic, magnetic, vibrational and optical properties of molecular and crystal structures. In addition, student will be trained about the Raman and UV-vis spectrometers.
<b>Interdisciplinary Aspects</b>	2DSense includes aspects from Physics, Materials Science, Chemistry and Biology
<b>Intersectoral Mobility</b> <input checked="" type="checkbox"/> Short Visit <input type="checkbox"/> Secondment	<i>Host: SIEMENS Healthineers (Türkiye)</i> <i>Context of Mobility: Innovation management, Entrepreneurship, Prototyping, IP rights, 3D modelling</i>
<b>Intersectoral Mobility</b> <input checked="" type="checkbox"/> Short Visit <input type="checkbox"/> Secondment	<i>Host: Istanbul Health Industry Cluster (ISEK)</i> <i>Context of Mobility: Entrepreneurship Training, Thematic Pre-incubation Program</i>
<b>International Academic Secondment</b>	<i>Host Supervisor: Milorad Milosevic</i> <i>Host Institution: University of Antwerp, Antwerp, Belgium</i> <i>Host Department: Physics</i> <i>Duration: 6 months-1 year</i> <i>Estimated Time of Mobility: Second year of the project</i>
<b>Main Supervisor</b>	
Brief CV	<b>Prof. Hasan Şahin</b>  E-mail: <a href="mailto:hasansahin@iyte.edu.tr">hasansahin@iyte.edu.tr</a>  <b>ACADEMIC DEGREES</b> Ph.D. Materials Science and Nanotechnology                      Bilkent University, Turkey                      2014  Google Scholar: <a href="https://scholar.google.com.tr/citations?hl=tr&amp;user=qwYs5WwAAAAJ">https://scholar.google.com.tr/citations?hl=tr&amp;user=qwYs5WwAAAAJ</a> <a href="https://orcid.org/0000-0002-6189-6707">https://orcid.org/0000-0002-6189-6707</a>

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Co-supervisors													
<b>Brief CV</b>	<p><b>Assoc. Prof. Bora Garipcan</b></p> <p>E-mail: <a href="mailto:bora.garipcan@iyte.edu.tr">bora.garipcan@iyte.edu.tr</a></p> <p><b>ACADEMIC DEGREES</b></p> <table><tbody><tr><td>Ph.D.</td><td>Bioengineering</td><td>Hacettepe University, Turkey</td><td>2008</td></tr><tr><td>M.Sc.</td><td>Chemistry/Biochemistry</td><td>Hacettepe University, Turkey</td><td>2001</td></tr><tr><td>B.Sc.</td><td>Chemistry</td><td>Hacettepe University, Turkey</td><td>1999</td></tr></tbody></table> <p>Google Scholar: <a href="https://scholar.google.com/citations?user=hmzDqY8AAAAJ&amp;hl">https://scholar.google.com/citations?user=hmzDqY8AAAAJ&amp;hl</a> <a href="https://orcid.org/0000-0002-1773-5607">https://orcid.org/0000-0002-1773-5607</a></p>	Ph.D.	Bioengineering	Hacettepe University, Turkey	2008	M.Sc.	Chemistry/Biochemistry	Hacettepe University, Turkey	2001	B.Sc.	Chemistry	Hacettepe University, Turkey	1999
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<b>Brief CV</b>	<p><b>Asst. Prof. Ceyda Öksel Karakuş</b></p> <p>E-mail: <a href="mailto:ceydaoksel@iyte.edu.tr">ceydaoksel@iyte.edu.tr</a></p> <p><b>ACADEMIC DEGREES</b></p> <table><tbody><tr><td>Ph.D.</td><td>Chemical Engineering</td><td>University of Leeds, UK</td><td>2016</td></tr><tr><td>M.Sc.</td><td>Chemical Engineering</td><td>University of Leeds, UK</td><td>2012</td></tr></tbody></table> <p>Google Scholar: <a href="https://scholar.google.co.uk/citations?user=sdO-VFIAAAAAJ&amp;hl">https://scholar.google.co.uk/citations?user=sdO-VFIAAAAAJ&amp;hl</a> <a href="https://orcid.org/0000-0001-5282-4114">https://orcid.org/0000-0001-5282-4114</a></p>	Ph.D.	Chemical Engineering	University of Leeds, UK	2016	M.Sc.	Chemical Engineering	University of Leeds, UK	2012				
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