Betül ALDEMIR DIKICI

Bioengineer, Lecturer & Biomaterials and Tissue Engineering Researcher (PhD)

Contact Information

Address : Izmir Institute of Technology, Department of Bioengineering, 35430, Urla /İzmir, Turkey

Email : aldemirbetul@gmail.com

Website : https://www.baldemirlab.com/

Portfolio : https://www.instagram.com/sciartofabirch/

Scientific Interests

Tissue engineering, biomaterials, bone&dental regeneration, additive manufacturing, emulsion templating, polymer synthesis, biopolymers, porous materials, decellularisation, and scientific art

Education

(2016-2020) **PhD,** University of Sheffield, Department of Materials Science and Engineering, Biomaterials and Tissue Eng. Group, UK

(2019, 02-09) **Visiting Researcher,** Massachusetts Institute of Tech., Harvard-MIT Biomedical Engineering Center, USA

(2014-2016) **MSc,** Izmir Katip Celebi University, Dept. of Biomedical Technologies, Turkey

(2009-2014) **BSc,** Anadolu University, Department of International Relations, Turkey

(2009-2013) **BSc,** Ege University, Department of Bioengineering, Turkey

(2004-2008) 60. Yil Anatolian High School, Turkey

Professional Experiences

(2021-) **Lecturer,** Izmir Institute of Technology (IZTECH), Department of Bioengineering, Turkey

(2020-2021) **Visiting Researcher,** The University of Sheffield, UK

(2017-2019) **Grad. Teaching Assistant,** The University of Sheffield, UK

(2016, 04-08) **Research Assistant,** Izmir University of Economics, Genetics and Bioengineering, Turkey

(2014-2015) **Project Researcher (TUBITAK),** Izmir Katip Celebi Uni., Biomedical Technologies, Turkey

(2013-2014) **Sample Acceptance and Reporting Manager,** Ecosur Laboratories, Turkey

(2012, 08-09) **Intern,** SCK-CEN Nuclear Research Centre, Microbiology Laboratory, Belgium

(2012, 06-07) **Intern,** Foot and Mouth Disease Institution, Production, Quality, Cell&Virus Bank Labs., Turkey

(2012, 01-02) **Intern,** Tuborg Beer and Malt Industry, Microbiology Laboratory, Turkey

(2011, 06-07) **Intern,** 9 Eylül University Hospital, Medical Biology and Genetics Laboratory, Turkey

(2010-2011) **Intern,** Ege University, Natural Products and Microbiology Laboratories, Turkey

Academic Honors, Awards & Scholarships

(2022) Langmuir, **Front Cover** *(Volume 38, Issue 36)*

(2022) Sabanci University, Center of Excellence for Functional Surfaces and Interfaces for Nano Diagnostics (EFSUN), Best Paper Competition 2022, **1st place**

(2022) The Best Lecture Design Award, Izmir Institute of Technology, **1st place**

(2022) Biomacromolecules, **Front Cover** *(Volume 23, Issue 3)*

(2021) Mike Sellars Prize and Medal in Materials Science and Engineering for **recognition of a high-quality PhD Thesis (The University of Sheffield)**

(2020) Doctoral Researcher Awards 2020 (DRA 2020), Engineering Sciences, **1st place**

(2020) Medical Illustration Competition of Inonu University, **1st place**

(2019) BITEG 21st Annual White Rose Work In Progress Meeting, **Best Poster Presentation**

(2019) Nature Reviews Cover Image Competition, Nature Reviews Rheumatology, **Winner**

(2019) Engineering Researcher Symposium, Poster of the Year, **Winner**

(2019) The University of Sheffield, 2019 Image Competition, Category: Biomaterials, **Winner**

(2019) The University of Sheffield, Faculty of Engineering Photography Competition, Category: The Future of Engineering, **Winner**

(2019) Battelle - Jeff Wadsworth Visiting Research Fellowship

(2019) Armourers & Brasiers Travel Grant *(October)*

(2019) Armourers & Brasiers Travel Grant *(April)*

(2019) Learned Society Travel Grant, University of Sheffield

(2018) BITEG 20th Annual White Rose Work In Progress Meeting, **Best Oral Presentation**

(2018) Early Career Colloid Meeting 2018, **Poster Prize Winner**

(2015) Ministry of National Education of the Republic of Turkey, Post-Graduate Scholarship

(2015) The Scientific and Technological Research Council of Turkey, Project Scholarship

(2015) 19th National Biomedical Engineering Meeting, **Best Poster Award**

(2012) IAESTE Internship Programme, Summer Internship, Belgium

Publications

SCI/SCIE-indexed

- **"Breast Tissue Engineering: Essentials, Recent Advances, and Challenges",** *(to be submitted).*
- **"Engineering of periodontal tissue interfaces using biodegradable multiphasic scaffolds",** *(to be submitted).*
- **"Quantitative Evaluation of Morphological Features of Tissue Engineering Scaffolds Using Deep Learningon Scanning Electron Microscope Images"**, *(to be submitted).*
- **Aldemir Dikici, B.***; Chen, M.*; Dikici, S., Reilly, G.; Chiu, H.; Claeyssens, F., (2023), **"Bone regeneration capacity of polycaprolactone based high internal phase emulsion (PolyHIPE) scaffolds in a rat calvarial defect model",** *ACS Applied Materials & Interfaces.,* https://doi.org/10.1021/acsami.3c04362 *(*co-first authors).*
- **Aldemir Dikici, B.**; Dikici, S.; Claeyssens, F., (2022), **"Synergistic effect of type and concentration of surfactant and diluting solvent on the morphology of emulsion templated matrices developed as tissue engineering scaffolds"**, *Reactive and Functional Polymers, 180, 105387*. https://doi.org/10.1016/j.reactfunctpolym.2022.105387.
- Durgut, E.; Sherborne, C.; **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2022), **"Preparation of Interconnected Pickering Polymerized High Internal Phase Emulsions by Arrested Coalescence"**, *Langmuir*, 38 (36), 10953–10962. https://doi.org/10.1021/acs.langmuir.2c01243.
- **Aldemir Dikici, B.;** Malayeri, A.; Sherborne, C.; Dikici, S.; Paterson, T.; Dew, L.; Hatton, P.; Ortega Asencio, I.; MacNeil, S.; Langford, C.; Cameron, N.; Claeyssens, F., (2022), **"Thiolene and polycaprolactone methacrylate-based polymerised high internal phase emulsion (PolyHIPE) scaffolds for tissue engineering",** *Biomacromolecules*, 23 (3), 720–730. https://doi.org/10.1021/acs.biomac.1c01129.
- Dikici, S.; **Aldemir Dikici, B.;** MacNeil, S.; Claeyssens, F., (2021), **"Decellularised Extracellular Matrix Decorated PCL PolyHIPE Scaffolds for Enhanced Cellular Activity, Integration and Angiogenesis",** *Biomaterials Science,* 9 (21), 7297–7310. https://doi.org/10.1039/D1BM01262B.
- **Aldemir Dikici, B.;** Claeyssens, F., (2020), **"Basic principles of emulsion templating and its use as an emerging manufacturing method of tissue engineering scaffolds",** *Frontiers in Bioengineering and Biotechnology,* 8, 875. https://doi.org/10.3389/fbioe.2020.00875.

- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2020), **"Boosting the osteogenic and angiogenic performance of multiscale porous polycaprolactone scaffolds by in vitro generated extracellular matrix decoration"**, *ACS Applied Materials & Interfaces.,* 12 (11), 12510-12524. https://doi.org/10.1021/acsami.9b23100.
- Dikici, S.*; **Aldemir Dikici, B.***; Issa Bhaloo, S.; Balcells, M.; Edelman, E.; MacNeil, S., Reilly, G.C.; Sherborne, C.; Claeyssens, F., (2020), **"Assessment of the angiogenic potential of 2-deoxy-D-ribose using a novel in vitro 3D dynamic model in comparison with established in vitro assays"**, *Frontiers in Bioengineering & Biotechnology*, 7 (451), 1–20. https://doi.org/10.3389/fbioe.2019.00451. *(*co-first authors)*
- Mangir, N.; **Aldemir Dikici, B.**; Chapple, C.R.; MacNeil, S., (2019), **"Landmarks in vaginal mesh development: polypropylene mesh for treatment of SUI and POP",** *Nature Reviews Urology,* 2019, 16 (11), 675–689. https://doi.org/10.1038/s41585-019-0230-2.
- **Aldemir Dikici, B.***; Dikici, S.*; Reilly, G.C.; MacNeil, S.; Claeyssens, F., (2019), **"A Novel Bilayer Polycaprolactone Membrane for Guided Bone Regeneration: Combining Electrospinning and Emulsion Templating"**, *Materials (Basel), 12*, 2643. https://doi.org/10.3390/ma12162643. *(*co-first authors)*
- **Aldemir Dikici, B.**; Sherborne, C.; Reilly, G.C.; Claeyssens, F., (2019), **"Emulsion templated scaffolds manufactured from photocurable polycaprolactone",** *Polymer (Guildf)*, *175*, 243–254. https://doi.org/10.1016/j.polymer.2019.05.023.
- **Aldemir, B.,** Dikici, S., Karaman, O., Oflaz, H., (2017), **"The effect of zinc oxide doping on mechanical and biological properties of 3D printed calcium sulfate based scaffolds"**, *Biocybernetics and Biomedical Engineering,* 37 (4), 733–741. https://doi.org/10.1016/j.bbe.2017.08.007.
- Dikici, S., **Aldemir, B.**, Gezgin, E., Başer, Ö., Şahin, S., Eser, H., Ercan, U. K., Yılmaz, B., Kelekçi, S., Oflaz, H. (2017), **"Development of a 2-dof uterine manipulator with LED illumination system as a new transvaginal uterus amputation device for gynecological surgeries"**, *Minimally Invasive Therapy & Allied Technologies*, 27 (3), 177–185. https://doi.org/10.1080/13645706.2017.1341927.

TR (ULAKBIM)-indexed

- Oflaz, H., **Aldemir, B.,** Dikici, S., (2017), **"The Effect of Heat Treatment on Physical, Chemical and Structural Properties of Calcium Sulfate Based Scaffolds"**, *Journal of Natural and Applied Science*, 21 (1).

- Dikici, S., **Aldemir, B.**, Gezgin, E., Başer, Ö., Şahin, S., Eser, H., Ercan, U. K., Yılmaz, B., Kelekçi, S., Oflaz, H. (2014), **"Development of transvaginal uterus amputation device for laparoscopic hysterectomies in gynecologic surgeries"**, *Journal of Natural and Applied Science*, 18 (3).
- **Aldemir, B.**, Dikici, S., Öztürk, Ş., Karaman, O., Şendemir Ürkmez, A.i Oflaz, H. (2014), "**3D tissue scaffold printing on custom artificial bone applications**", *Journal of Natural and Applied Science*, 18 (3).

Conference Papers (Full-text)

- Oflaz, H., Dikici, S, **Aldemir Dikici, B.**, Eser, H., Gezgin, E., Baser, O., Sahin, S., Yilmaz, B.," **Designing and Prototyping A New Uterine Manipulator with two plane motion mechanism and LED Marker Illumination System"**, 20th Biomedical Engineering Meeting (BIYOMUT), IEEE.
- Dikici, S., Eser,H., **Aldemir, B.,** Gezgin, E., Başer,Ö., Şahin, S., Oflaz, H., (2015), "**Designing and prototyping of a new uterine manipulator which will overcome drawbacks of conventional uterine manipulators and assist laparoscopic hysterectomies**", 19th Biomedical Engineering Meeting (BIYOMUT), IEEE.
- **Aldemir, B.,** Dikici, S.,Karaman, O., Oflaz, H., (2015), "**Development, 3D printing and characterization of calcium sulfate based scaffolds for bone tissue engineering"**, 19th Biomedical Engineering Meeting (BIYOMUT), IEEE.

Presentations

International Presantations

Oral Presentations

- **Aldemir Dikici, B.;** Karaca, İ.; Çullu, S.; Özkendir, Ö.; Erdoğan, O.; Yaşar, H.; Claeyssens, F., (2022), "Mens et Manus": pART of science and engineering. With a case study on the development of a novel bilayer membrane for guided bone regeneration, The 26th International Biomedical Science & Technology Symposium (BIOMED 2022), Ankara, Turkey.
- Kocagöz, M.; **Aldemir Dikici, B.,** (2022), "Synthesis and characterisation of bone-like apatite layer coated photocurable polycaprolactone -based high internal phase emulsions (PolyHIPE) and evaluation of its potential as a bone graft", 4th International Eurasian Conference on Science, Engineering and Technology (EurasianSciEnTech 2022), Ankara, Turkey.
- **Aldemir Dikici, B.**, (2021), "Photopolymerised high internal phase emulsions (PolyHIPEs) with tunable morphological properties for soft and hard tissue engineering", International Eurasian Conference on Sci., Engineering and Technology, Ankara, Turkey.

- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2019), "Boosting the biological performance of multiscale porous scaffolds by in vitro generated extracellular matrix decoration", TERMIS European Chapter Meeting, Rhodes, Greece.
- **Aldemir Dikici, B.**; Dikici, S.; Reilly, G.C.; MacNeil, S.; Claeyssens, F., (2018), "Scientific&medical illustration: worth a thousand words", International Eurasian Conference on Science, Engineering and Technology, Ankara, Turkey.
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2018), "Improving biological performance of 3DP multiscale porous polymer scaffolds by in vitro generated extracellular matrix", International Eurasian Conference on Sci., Engineering and Technology, Ankara, Turkey.
- **Aldemir, B.,** Oflaz, H., Karaman, O., (2015), "Non-verbal description of science by medical illustration", 21st International Biomedical Science and Technology Symposium, BIOMED, Antalya, Turkey.

Poster Presentations

- Karaca, I.; **Aldemir Dikici, B.**, (2022), "Quantitative evaluation of morphological features of tissue engineering scaffolds using deep learning (YOLOv5x6 object detection) on scanning electron microscope images", The 26th International Biomedical Science & Technology Symposium (BIOMED 2022), Ankara, Turkey.
- Başlar, M. S., Öksel Karakuş, C., **Aldemir Dikici, B.**, (2022), "Development of Novel Nanotoxicity Assessment Method Utilizing 3D Printing System", IUTOX XVIth International Congress of Toxicology, Maastricht, the Netherlands.
- Kul, D., Tihminlioglu, F., **Aldemir Dikici, B.**, (2021), "Biomimetic functionalisation of photocurable polycaprolactone tetramethacrylate-based polymerised high internal phase emulsions (PolyHIPEs) and evaluation of its potential as a bone graft substitute", International Eurasian Conference on Science, Engineering and Technology, Ankara, Turkey.
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2019), "Development of emulsion templated scaffolds manufactured from photocurable polycaprolactone", TERMIS European Chapter Meeting, Rhodes, Greece.
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2018), "Effect of in vitro Generated Extracellular Matrix on Osteogenic Potential of Additive Manufactured Multiscale Porous Hybrid Scaffolds", 2018 TERMIS World Congress, Kyoto, Japan.

- **Aldemir, B.,** Dikici, S., Karaman, O., Oflaz, H., (2015), "Development, production and characterization of calcium sulfate based 3D scaffolds", 21st International Biomedical Science and Technology Symposium, BIOMED, Antalya, Turkey.

National Presentations

Oral Presentations

- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2021), Development of polymer-based scaffolds with hierarchical porosity and enhancement of osteoinductive and angiogenic performance by bone extracellular matrix decoration, BIOMED2021 (25. Ulusal Biyomedikal Bilim ve Teknoloji Sempozyumu), Ankara, Turkey.
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2019), "Can the biological performance of 3D printed synthetic polymeric scaffolds be boosted by in vitro generated extracellular matrix decoration?", BioMedEng2019, London, UK.
- **Aldemir Dikici, B.**; (2019), "You want your missing tooth back? Start by winning the competition against your gum tissue!", Engineering Researcher Symposium, Sheffield, UK.
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2018), "Enhancing biological performance of multiscale porous scaffolds by in vitro generated extracellular matrix decoration", BITEG 20th Annual White Rose Work In Progress Meeting, Sheffield, UK. *(Best oral presentation)*
- **Aldemir, B.**, Dikici, S., Öztürk, Ş., Karaman, O., Şendemir Ürkmez, A.i Oflaz, H. (2014), "3D tissue scaffold printing on custom artificial bone applications", Internationally Participated 7. National Biomechanics Congress, Isparta, Turkey.

Poster Presentations

- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2019), "Boosting the osteogenic and angiogenic performance of 3D printed synthetic scaffolds by in vitro generated extracellular matrix decoration", BITEG 21th Annual White Rose Work In Progress Meeting, Sheffield, UK.
- **Aldemir Dikici, B.**; Dikici, S.*; Reilly, G.C.; MacNeil, S.; Claeyssens, F., (2019), "A novel bifunctional membrane for guided bone regeneration: combining electrospinning and emulsion templating", BITEG 21th Annual White Rose Work In Progress Meeting, Sheffield, UK. *(Best poster presentation)*
- **Aldemir Dikici, B.**; Dikici, S.*; Reilly, G.C.; MacNeil, S.; Claeyssens, F., (2019), "Bifunctional guided bone regeneration membrane: combining electrospinning and emulsion templating", BioMedEng2019, London, UK.

- **Aldemir Dikici, B.**; (2019), "Additive manufactured multiscale porous scaffolds with enhanced biological performance for tailor-made bone repair", Engineering Researcher Symposium (ERS), Sheffield, UK. *(Poster of the year)*
- **Aldemir Dikici, B.**; Claeyssens, F., (2018), "Effect of porogenic solvents on morphology of emulsion templated scaffolds made of polycaprolactone, Early Career Colloid Meeting, Sheffield, UK. *(Poster Prize Winner)*
- **Aldemir Dikici, B.**; Reilly, G.C.; Claeyssens, F., (2018), "Photocurable emulsion templated scaffolds made of solely polycaprolactone methacrylate", BITEG 20th Annual White Rose Work In Progress Meeting, Sheffield, UK.
- **Aldemir, B.,** Dikici, S.,Karaman, O., Oflaz, H., (2015), "Development, 3D printing and characterization of calcium sulfate based scaffolds for bone tissue engineering", 19. National Biomedical Engineering Meeting, BİYOMUT, Istanbul, Turkey.

Research Projects

(TUSEB-2022B02-22517) Health Institutes of Turkey	Development of injectable bone grafts	Project Coordinator *(Ongoing)*
(2022IYTE-2-0025) Izmir Institute of Technology, Scientific Research Projects (BAP-AUDP)	Development of bilayer nanocomposite scaffolds for osteochondral tissue engineering	Project Coordinator *(Ongoing)*
(2021IYTE-1-0110) Izmir Institute of Technology, Scientific Research Projects (BAP-GAPB)	High internal phase emulsions (PolyHIPE) for bone tissue engineering	Project Coordinator *(Ongoing)*
(TUBITAK-1919B012206638) The Scientific and Technological Research Institution of Turkey (2209-A)	Quantitative evaluation of morphological features of tissue engineering scaffolds using deep learning	Academic Advisor *(Ongoing)*
(TUBITAK-1919B012219680) The Scientific and Technological Research Institution of Turkey (2209-A)	Development of natural polymer-based nanocomposite scaffolds for use in bone tissue engineering	Academic Advisor *(Ongoing)*
(TUBITAK-221S594) The Scientific and Technological Research Institution of Turkey (3501)	Developing bioactive and antimicrobial dermal skin substitutes for use in wound treatment and investigating its wound treatment potential *in vitro* and *in vivo*.	Researcher *(Ongoing)*

(2015-TYL-FEBE-0016) Izmir Katip Celebi Uni, General Research Project	Development, manufacturing and characterization of ceramic based 3D Tissue Scaffolds	Project Coordinator *(Completed)*

Editorial

(2023-Present) / Reviewer	ACS Omega
(2022-Present) / Reviewer	Langmuir, ACS Applied Polymers
(2021-Present) / Reviewer	Journal of Materials Chemistry B, Biomacromolecules, Membranes, International Journal of Molecular Sciences, Crystals, Coatings
(2020-Present) / Reviewer	Journal of Functional Biomaterials
(2020-Present) / Topic Editor&Reviewer	Materials

Teaching

BE311 Bioprocess Engineering	Lecturer (IZTECH, Bioengineering)
BE410 Introduction to Tissue Engineering	Lecturer (IZTECH, Bioengineering)
BE208 Biochemistry	Lecturer (IZTECH, Chemical Engineering)
CHEM222 Introduction to Biochemistry	Lecturer (IZTECH, Chemical Engineering)
BE351/BE352/BE451 Research Projects	Lecturer (IZTECH, Bioengineering)
BE404 Bioengineering Lab III	Lecturer (IZTECH, Bioengineering)
BE501/BE502 Principles of Bioengineering I-II	Guest Lecturer (IZTECH, Bioengineering)
BTEC507 Fundamentals of Biotechnology	Guest Lecturer (IZTECH, Food Engineering)
CHE439 Biomaterials	Guest Lecturer (IZTECH, Chemical Engineering)
COM161 Intro. to Programming&Problem Solving	GTA (The University of Sheffield)
MAT1510 Anatomy	GTA (The University of Sheffield)

Teamwork Activities

(2023) BIOMED2023 (The 27th Biomedical Science & Technology Symposium), Organising Committee, Izmir, Turkey

(2021) BioMedEng21, Local Organising Committee, Sheffield, UK

(2014) International Symposium on Innovations in Intelligent Systems and Applications Organization Committee, Izmir, Turkey

(2014) I. Internationally Participated Prostheses, Implants and Orthesis Design Workshop, Organization Committee, Izmir, Turkey

(2011) Tissue Engineering Symposium, Organization Committee, Izmir, Turkey

(2011) Cittaslow (Slow City) Annual General Meeting, Volunteer Translator, Izmir, Turkey

Computer Skills

MS Office, Adobe Photosphop and Illustrator, Python, Solidworks, Fusion 365, MarvinSketch, GraphPad, Mendeley, MestReNova

Others

Training Program for Certificate of Animal Use in Experimental Studies, 2021, Dokuz Eylul University, Faculty of Medicine, Local Ethics Committee for Animal Experiments (Category: A)

Jury Member, Sabanci University, Center of Excellence for Functional Surfaces and Interfaces for Nano Diagnostics (EFSUN), Best Paper Competition 2023

Social Interests

Digital illustration, painting, writing/poetry, tattoo