

Kemal Arda Günay, Ph.D.

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EDUCATION

- 2016 – Present **Postdoctoral Research in Department of Chemical & Biological Engineering and the Biofrontiers Institute**
Howard Huges Medical Institute (2016 - 2017) and University of Colorado at Boulder, United States.
- 2011 – 2016 **Ph. D. in Laboratory of Polymers**
École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.
- 2009 – 2011 **M. Sc. in Materials Science and Engineering**
EPFL, Switzerland. Grade – 5.53/6.00.
- 2005 – 2009 **B. Sc. in Materials Science and Engineering**
Minor in Chemistry
Sabanci University, Turkey. GPA – 3.50/4.00.

RESEARCH EXPERIENCE

Postdoctoral fellow in Howard Hughes Medical Institute (HHMI) (2016-2017) and University of Colorado at Boulder: September 2016 – present.

Supervisor Prof. Kristi S. Anseth

- I currently develop novel hydrogel formulations that can be formed by photopolymerization for expansion microscopy applications, which we refer to as PhotoExM technology.
 - As an advancement of the PhotoExM technology, I am developing a secondary technology that allows expansion of a biological samples grown on or in a biomaterial. We refer to this technology as gel-to-gel transfer technology (GtG).
 - As an improvement of the PhotoExM technology, I am developing a method that allows iterative expansion of biological samples labeled with conventional antibodies, allowing sub 20 nm imaging resolution using a conventional confocal microscope. We refer to this technology as Photoiterative expansion microscopy (PhotoiExM).
- I developed dynamically stiffening hydrogels based on anthracene groups as a tool to study cellular mechanobiology *in situ*. We further developed this hydrogel platform to mimic physical changes taking place during cardiac fibrosis and skeletal muscle injury.
- I explore the relationship between autophagy and cellular mechanotransduction in skeletal muscle cells using dynamically stiffening hydrogels.

Ph.D. thesis: Bioinspired selective surface deposition of fragrance delivery systems: 2011 - 2016

Supervisor Prof. Harm-Anton Klok

Description I developed smart polymeric fragrance delivery systems that can selectively recognize and deposit onto cotton fabric and human hair by using phage display identified peptides. We carried out the work in close collaboration with **Firmenich SA**.

- Identification of cotton fabric and human hair-binding peptides using phage display.
- Synthesis of peptide-polymer conjugates that selectively deposits onto cotton fabric and human hair.
- Preparation of fragrance loaded, peptide functionalized nanoparticles.
- Nominated to best thesis award in EPFL for the year 2016.

PUBLICATIONS

- 1 - **K. A. Günay**, T. L. Ceccato, J. S. Silver, K. L. Bannister, O. J. Bednarski, L. A. Leinwand, K. S. Anseth, “**PEG-anthracene hydrogels as an on-demand stiffening matrix to study mechanobiology**”, *Angewandte Chemie International Edition*, **2019**, *131*, 10017-10021.
- 2 – J. S. Silver, **K. A. Günay**, A. A. Cutler, T. O. Vogler, T. E. Brown, B. T. Pawlikowski, O. J. Bednarski, K. L. Bannister, C. J. Rogowski, A. G. McKay, F. W. DelRio, B. B. Olwin, and K. S. Anseth, “**Injury mediated stiffening persistently activates muscle stem cells through mechanotransduction pathways**”, Accepted in *Science Advances*
- 3 – T. E. Brown, Jason S. Silver, Brady T. Worrell, Ian A. Marozas, F. Max Yavitt, **K. A. Günay**, Christopher N. Bowman and Kristi S. Anseth, “**Secondary Photocrosslinking of Click Hydrogels To Probe Myoblast Mechanotransduction in Three Dimensions**”, *Journal of the American Chemical Society*, **2018**, *140*, 11585-11588.
- 4 - **K. A. Günay**, D. L. Berthier, H. A. Jerri, D. Benczédi, H.-A. Klok and A. Herrmann, “**Selective peptide-mediated enhanced deposition of polymeric fragrance delivery systems on human hair**”, *ACS Applied Materials & Interfaces*, **2017**, *9*, 24238-24249.
- 5 - **K. A. Günay**, D. L. Berthier, A. Herrmann and H.-A. Klok, “**Peptide-enhanced selective surface deposition of polymer-based fragrance delivery systems**”, *Advanced Functional Materials*, **2017**, *27*, 1603843.
- 6 - **K. A. Günay**, H.-A. Klok, “**Synthesis of cyclic peptide disulfide-PPMA conjugates via sequential active ester aminolysis and CuAAC coupling**”, *Polymer Chemistry*, **2016**, *7*, 970-978.
- 7 - **K. A. Günay** and H.-A. Klok, “**Identification of soft matter binding peptide ligands using phage display**”, *Bioconjugate Chemistry*, **2015**, *26*, 2002-2015.
- 8 - **K. A. Günay**, P. Théato and H.-A. Klok, “**Standing on the shoulders of Hermann Staudinger: Post-polymerization modification from past to present**”, *Journal of Polymer Science Part A: Polymer Chemistry*, **2013**, *51*, 1-28.
- 9 - **K. A. Günay**, P. Théato, and H.-A. Klok, “**History of post-polymerization modification**”, *Functional Polymers by Post-Polymerization Modification: Concepts, Guidelines and Applications*, **2013**, 1-44.
- 10 - **K. A. Günay**, N. Schüwer and H.-A. Klok, “**Synthesis and post-polymerization modification of poly(pentafluorophenyl methacrylate) brushes**”, *Polymer Chemistry*, **2012**, *3*, 2186-2192.

INTELLECTUAL PROPERTY

- 1 - **K. A. Günay**, K.S. Anseth, L. MacDougall, “**Swellable Photopolymerized Hydrogels for Expansion Microscopy**”, Owner: University of Colorado Boulder, *Currently on provisional application stage*.

MENTORSHIP/TEACHING

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|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summer 2019 | Mentoring first year MD/PhD student Nathaniel Skillin, in “Developing light-mediated hydrogel platforms for iterative expansion microscopy”. |
| Spring 2019 | Mentored first year graduate student Xinyi Fu, in “Developing synthetic hydrogel platforms for the expansion of primary muscle satellite cells”. |
| Fall 2018-Curr. | Mentoring undergraduate researcher Cameron Rogowski, in “Developing three dimensional hydrogel culture platform for skeletal muscle satellite cells”. |
| 2017-2019 | Mentored undergraduate researchers Kendra Bannister and Olivia Bednarski, in “Understanding the role of chaperone-mediated autophagy in skeletal muscle cell mechanotransduction”. |
| Summer 2018 | Mentored undergraduate researcher Emily Rhodes in “Assessing mechanoresponsiveness of Notch and Nkx2.5 signaling in C2C12 cells using dynamic hydrogels.” |
| Fall 2012-2015 | Teaching Assistant for the master’s level course “Polymer Chemistry and Macromolecular Engineering” in the Materials Science and Engineering Department in EPFL. |
| Spring 2014 | M. Sc. thesis of Szu-Ying Tu, “Influence of the local charges on the alkylation and dealkylation of methionine-containing peptides”. |

Fall 2012 **Semester project** of Lina Klockare, “Investigating the influence of different surface-initiated ATRP agents to growth kinetics of polymer brushes”.

PRESENTATIONS

April 2019 Oral presentation in 2019 Annual Meeting of Society of Biomaterials in Seattle, USA, “Anthracene based dynamic hydrogels to probe stiffness-mediated changes in cardiac fibroblasts”.

August 2018 Oral presentation in 256th American Chemical Society (ACS) meeting in Boston, USA, “On demand stiffening poly(ethylene glycol) (PEG) hydrogels via [4+4] photocycloaddition of anthracenes”.

WORK EXPERIENCE

June 2015 **Research Intern**, FIRMENICH SA.

- I carried dynamic headspace sampling measurements using fragrance loaded nanoparticles.

2013 – 2016 **Research Scholar**, PRESCOUTER, INC.

- I provided online consultancy as a global research scholar to leading companies in their field such as **General Cable**, **Afton**, **Bridgestone**, **PepsiCo**, **Nova Chemicals**, **BASF**, **Sun Products** and **UPM Raflatac**.

LANGUAGES

Turkish **Mother tongue**

English **Full working proficiency**

French **Limited working proficiency**