

# HAKAN CELIK

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## MACHINE LEARNING ENGINEER

Self-starting machine learning engineer with solid experience in independent research and technical problem-solving. Adept at evaluating processes, and leveraging technical knowledge, problem solving skills, and strategic thinking to implement solutions that streamline operations and promote efficiency, while meeting regulatory requirements. Regularly published in peer-reviewed publications extolling details of protein-based polymer and collagen-based biomaterial research findings. Works independently, and as part of a team, in deadline-driven environments.

## KEY AREAS OF EXPERTISE

• Java • Python • Bioinformatics • Analytical Skills • Protein Sciences • Research and Development (R&D)

## EDUCATION

**Doctor of Philosophy, Biomedical Engineering Candidate**  
University of North Dakota, Grand Forks, ND

**Master of Science, Biomedical Engineering**  
Cleveland State University, Cleveland, OH

**Bachelor of Science, Physics**  
Dicle University Fenn College of Science, Diyarbakir, Turkey

**Java Full-Stack Bootcamp**  
We Can Code IT, Cincinnati, OH

## CERTIFICATIONS

AWS Technical Essentials, Machine Learning with Python, Data Analysis with Python, Python for Data Science and Artificial Intelligent (AI) by IBM, Data Visualization with Python, Databases and SQL for Data Science, What is Data Science? By IBM, Open Source tools for Data Science by IBM, Data Science Methodology by IBM, English Second Language (ESL), Animal Care and Use (ACU), The College of American Pathologists certifies: Quality Culture and Walkthrough.

## EXPERIENCE

**Amazon.com, Inc.**, Hebron, KY **November 2020 – Present**  
**Clinical Laboratory Scientist - Amazon STS Lab 2 LLC Division**  
Served as training ambassador and coordinator.

- Conducted SARS-CoV-2 test by performing appropriate methods.
- Trained new hiring scientists and current scientists.
- Coordinator: responsible for coordinating the team to deliver the test results to customers appropriately.

**University of North Dakota, Grand Forks, ND (Remotely)** **March 2020 – Present**  
**PhD Candidate**

- Achieved computer vision-based identification and grading of diabetic retinopathy by implementing Python and MatLab machine learning architectures.
- Analyzed the epigenetic mechanism of SARS-CoV-2 and GFP+CSC-H460 tumor cells to reveal the similarity of PBMC epigenetic activities by implementing R codes.
- Analyzed the epigenetic activation of SARS-CoV-2 in four different disease conditions that were healthy, moderate, severe, and intensive care unit (ICU) by performing R codes.
- Achieved a new model that is automatically identified the cardiac abnormality or abnormalities present in 12-lead ECG recording by implementing Python.

- Using analytical skills designed, implemented, and evaluated new models and rapid software prototypes to solve problems in machine learning and systems engineering.

**Louis Stokes Cleveland VA Medical Center**, Cleveland, OH  
**Biological Lab Tech**

**November 2018 – June 2019**

- Managed R&D projects, including setting timelines and coordinating deliverables.
- Used analytic skills developed novel biomaterial and treated in-vivo inflammation such as subglottic and tracheal stenosis.
- Assisted in the surgical operation to implant the stent in the rabbit trachea.
- Injected drugs, performed post-op checking, and monitored the rabbit after surgery.
- Solved complex problems in synthesis, formulation, processes, testing and root causes.
- Worked with associated technology and software applications to manipulate and synthesize data for research projects.

**Case Western Reserve University** Cleveland, OH  
**Research and Development Engineer**

**June 2015 – Nov 2017**

Managed and conducted engineering and detailed experimental tests to collect design data and assist in research work.

- Prepared, monitored, and examining protocols, process, and outcomes for bio-fabrication of materials used in medical treatments; collagen ring for eyes treatment to prevent inflammation delivering drug; for treatment of Stress urinary incontinence (SUI), collagen mesh created by filament winding; artificial collagen tendons was created and replaced in rabbit tendons, and observed new tissue formation.
- Developed a new protocol for decellularized collagen extraction and purification.
- Collagen sheet covered with hyaluronic acid by creating a novel crosslink method for wound healing.
- Operated a Computer Numerical Control (CNC) device by creating a model for winding collagen sutures and drilling soft materials.
- Performed detailed analysis to compare and quantify system requirements, costs, and risks; was able to save money, save time, improve efficiency.

**Collgen - LLC**, Cleveland, OH  
Process Engineer

**November 2017 – 2018**

Managed to delivery collagen-based scaffolds for use in biology, regenerative medicine, and tissue engineering.

- Advised customers and other project stakeholders on relevant technical concerns and feasible solutions.
- Performed product introduction and technical support to customer.
- Inspected systems, diagnosed problems, and developed optimal solutions.

**Cleveland State University**, OH  
**Student Volunteer**

**August 2012 –2015**

Assisted professors in conducting laboratory work; assisted students in conducting lab work and research utilizing equipment, techniques, and professional analytic tools and programs.

- Managed the project to create a truss and develop a model in MATLAB to analyze experimental data to measure surface tension.
- Utilizing analytical skills measured time and temperature-dependent responsive protein-based polymers and surfactant solutions surface tension using ramè-hart goniometer/tensiometer.
- Familiar with 3D modeling and designing using printers and Solid works.
- Performed experiments related to protein design and biosynthesis; harvested bacteria plasmids used for protein expression and purification.
- Proficient at protein expression and purification methods; modified collagen with ELP.
- Measured kinetic, specific, and relative viscosity and volume fraction of block copolymer and H40 at different concentrations and molecular weights.
- Gathered, arranged, and corrected research data to create representative graphs and charts highlighting results for presentations.
- Supported research and development efforts to create new products, equipment, and processes.

Ohio Army National Guard  
Team leader

May 2014 – Present

### ADDITIONAL RELEVANT EXPERIENCE

Physics and Chemistry Teacher at Republic of Turkey

### COMPETENCIES

#### Technical

Java, HTML, CSS, Python, MATLAB, SQL, R, RStudio IDE, JupyterLab, Zeppelin Notebook, IBM Watson Studio, Raspberry, Solidworks, Programmable Logic Controller (PLC), Computer Integrated Manufacturing (CNC), Microsoft Office (Word, Excel, and PowerPoint)

#### Laboratory Equipment

Sonication Machine, Autoclave, Gel Electrophoresis, Cell Culture, Centrifuge, Canon Viscometer, 3D Printer, Spectrophotometry, SDS-PAGE, Goniometer, Polarized Microscope, Testing Equipment, Fluorescence Microscopy, Hamilton Microlab STARlet, MGISP-960, Agilent Bravo, Thermo Fisher 7500 PCR platform.

### PATENTS

1. **Hakan Celik**, Ozan Akkus, "Sticking of Collagen Threads by Maltodextrin", Case Western Reserve University, Case#2018-3465 (submitted)

### PUBLICATIONS

1. **Hakan Celik**, "Time and Temperature Dependent Surface Tension Measurements of Responsive Protein - Based Polymer Surfactant Solutions" (2015). *ETD Archive*. 470.
2. Ahmad O Khalifa, Ilaha Isali, **Hakan Celik** 3, Michael Mastran, Phillip McClellan, Callan Gillespie, Subba Shankar, Gregory T MacLennan, James M Anderson, Fredrick R Schumacher, Ozan Akkus, Adonis K Hijaz "A preliminary evaluation of in vivo response to a filament-wound macroporous collagen midurethral sling in an ovine model" *J Biomed Mater Res B Appl Biomater*. 2022 Jul 2. doi: 10.1002/jbm.b.35120
3. Yu Xie, Jiyang Chen, **Hakan Celik**, Ozan Akkus, Martin W King "Evaluation of an electrochemically aligned collagen yarn for textile scaffold fabrication" *Biomedical Materials*, 2021 Jan 14.
4. Fan Zhang; Tushar Bambharoliya; Yu Xie; Lajun Liu; **Hakan Celik**; Lu Wang; Ozan Akkus; Martin W. King "A Hybrid Vascular Graft Harnessing the Superior Mechanical Properties of Synthetic Fibers and the Biological Performance of Collagen Filaments" *Materials Science and Engineering: C (IF 5.880)*, 2020-08-22, DOI: 10.1016/j.msec.2020.111418
5. Fan Zhang, Yu Xie, **Hakan Celik**, Ozan Akkus, Susan H. Bernacki, Martin W. King "Engineering Small-Caliber Vascular Grafts from Collagen Filaments and Nanofibers with Comparable Mechanical Strength to Native Vessels" *Biofabrication*. 2019 Apr 3. doi: 10.1088/1758-5090/ab15ce.
6. Jiyang Chen, Yu Xie, **Hakan Celik**, Ozan Akkus, Martin W King "Electrochemically aligned collagen yarn for textile scaffold fabrication" *SSRN*, May 27, 2019, 47 Pages.

### CONFERENCE PAPERS

1. **Hakan Celik**, Nolan B. Holland "Time and Temperature Dependent Surface Tension of Thermally Responsive Protein-Based Polymer Surfactants" (Cleveland State University, Research Day, 2017 October 27)
2. Adil Mistry, **Hakan Celik**, Nolan B. Holland "Formation of bioactive hydrogels through the cross-linking of thermally responsive polypeptide micelles" *Chemical Biomedical Engineering*, Cleveland State University, Cleveland, Ohio, United States (254<sup>th</sup> Washington DC, Jun 2016)
3. Zhipeng Dong, **Hakan Celik**, Clare Rimnac, Ozan Akkus "Treatment of Tracheal Stenosis by eluting bio-

*absorbable Stent*" ShowCase research, Case Western Reserve University, 2019 May 19.

4. Ilaha Isali, Khalifa Ahmad, **Hakan Celik**, Callan Gillespie, Robb Colbrunn, Subbakrishna Shankar, Kathleen Derwin, Adonis Hijaz, Ozan Akkus "*Filament Wound Collagen Sling for Treatment of Urinary Incontinence: In vivo Ovine Model*" (Society for Biomaterials Annual Meeting & Exposition, 3-6 April 2019, Seattle, WA)
5. Ilaha Isali , Khalifa Ahmad, **Hakan Celik**, Callan Gillespie, Robb Colbrunn, Subbakrishna Shankar, Kathleen Derwin, Adonis Hijaz, Ozan Akkus "*Pure Collagen Crosslinked Sling for Treatment of Stress Urinary Incontinence in Ovine Model*" (ShowCase research, Case Western Reserve University, 2019 May 19)
6. Khalifa Ahmad, Ilaha Isali, **Hakan Celik**, Callan Gillespie, Robb Colbrunn, Kathleen Derwin, Subbakrishna Shankar, Gregory T. MacLennan, Adonis Hijaz, Ozan Akkus "*One-Year Evaluation of a Macroporous Pure Collagen Fabric in Ovine Model as a Novel Midurethral Sling*" (AUGS/IUGA Joint Scientific Meeting 2019, sub)
7. Khalifa Ahmad, Ilaha Isali, **Hakan Celik**, Callan Gillespie, Robb Colbrunn, Kathleen Derwin, Subbakrishna Shankar, Gregory T. MacLennan, Adonis Hijaz, Ozan Akkus "*One-Year Evaluation of a Macroporous Pure Collagen Fabric in Ovine Model as a Novel Midurethral Sling*" (AUA Scientific Meeting, Chicago, May 3-6, 2019)
8. Ahmad Khalifa, Ilaha Isali, **Hakan Celik**, Callan Gillespie, Robb Colbrunn, Kathleen Derwin, Subbakrishna Shankar, Gregory T. MacLennan, Ozan Akkus, and Adonis Hijaz, "*One-Year Evaluation of a Macroporous Pure Collagen Fabric in Ovine Model as a Novel Midurethral Sling*" Celebrating the IUGA 44<sup>th</sup> Annual Meeting and AUGS PDF week 2019, September 24-28, 2019, Nashville, TN-USA)