

VALERII KULAGIN

doubledecker@gmail.com

portfolio: valerii-kulagin.com/about
github.com/valerii-kulagin

SKILLS

Programming: Matlab, Javascript, Python

Software: Autodesk Fusion 360, SOLIDWORKS, MATLAB, Graphpad Prism 9, JMP Pro 16, Tableau, Minitab, Trios, Materialise Mimics, Materialise 3-Matic, Materialise Magics, RheoCompass, MestReNova, R studio, Ansys Workbench, Fritzing, Arduino IDE

Laboratory: medical device design and verification, GMP, cleanroom operation, SLS / DLP / SLA / Extrusion / Polyjet 3D printing, polymer synthesis and modification, cell culture, DSC, FTIR, rheometry, uCT, NMR, tensile testing, hydrogel synthesis, cell imaging, histology

Equipment: GPC, SEM, FTIR, NMR, DSC, RT-qPCR, uCT, rheometer, Instron tensile tester, Stratascys J750 / F170, EOS P110, Cellink LumenX, Form 2 Formlabs 3D printers, rotary evaporator, plate reader, flow cytometer, digital microscope, fluorescence microscope, centrifuge, biosafety cabinet, fume hood

Management: personnel recruiting and training, equipment and inventory management, public outreach

WORK EXPERIENCE

Georgia Institute of Technology

Atlanta, GA

Tissue Engineering and Mechanics (Hollister) Lab

Since Sep 2023

Research Engineer I

- Actively engaging in experiment design and preparation, compiling and summarizing data in conjunction with assigned scientific experiments, preparing statistical analyses and maintaining related records
- Leading a study on polymer powder milling and SLS 3D printability for medical device applications
- Designing and manufactured medical devices in a cleanroom in compliance with good manufacturing practices (GMP) for clinical translation, and performing all record keeping associated
- Participating in preparation of presentations, manuscripts, and intellectual property (IP) disclosures
- Operating various equipment used in research studies, developing expertise on the hardware and software associated with said equipment, and training co-workers on this equipment
- Maintaining laboratory equipment, communicating with manufacturers and vendors, overseeing visits from equipment technicians, and coordinating contracts related to equipment
- Ordering supplies, requesting quotes from vendors, requesting purchase orders from financial administrators, and coordinating the payment of invoices
- Performing various IT-related tasks, installing software, purchasing software licenses, coordinating with department IT administrators to ensure all hardware and software needs are being met
- Onboarding new students, faculty and staff

- Managing the training and maintenance for a 3D printer equipment group through the Institute's shared user management system
- Working with safety and facilities administrators to process waste and clean dishware
- Maintaining the lab's website and social media accounts

EDUCATION

Georgia Institute of Technology	GPA 3.57/4.0
Bachelor of Science, Biomedical Engineering	August 2021 – May 2023
University of Illinois at Chicago (UIC)	GPA 3.89/4.0
Bachelor of Science, Biomedical Engineering (Transferred out)	August 2018 - May 2021

RESEARCH and PROJECT EXPERIENCE

<i>Georgia Institute of Technology</i>	Atlanta, GA
Tissue Engineering and Mechanics (Hollister) Lab	Jan 2022 – Apr 2023
Undergraduate Research Assistant	
<ul style="list-style-type: none"> - Assisted in research and development of novel methacrylation process for 3D printable implantable shape memory polymer which increased the reaction yield by 300% - Carried out polycondensation and methacrylation reactions to make shape memory polymer - Analyzed data from multiple tests using Graphpad Prism 9 and JMP Pro 16, by conducting ANOVA and fitting regression models - Evaluated polymer molecular structure using NMR and MestreNova software - Collected polymer thermal data using DSC and analyzed it using Trios software, to get insights into crystallization enthalpy and transition temperature - Conducted tensile testing of 3D printed polymer using biaxial tester to evaluate elastic moduli - 3D printed shape memory polymer using DLP printer - Developed standard operating procedures (SOP) for synthesis reactions and 3D model generation - Trained undergraduate students to carry out reactions and use DSC and rheometry machines - Obtained micro-CT images of 3D printed polycaprolactone airway support device and analyzed them using Materialise Mimics software to get insight into device degradation profile needed to obtain investigational device exemption (21 CFR 812) from the FDA 	
<i>University of Illinois at Chicago</i>	Chicago, IL
Alsberg Stem Cell & Engineered Novel Therapeutics (ASCENT) Lab	Sep 2020 – April 2021
Undergraduate Research Assistant	
<ul style="list-style-type: none"> - Cultured stem and cancer cells adhering to GLP and standard operating procedures (SOP) - Assisted in live/dead viability assays using special kit and fluorescence microscope - Conducted histology analysis of cell aggregates using tissue sectioner, tissue embedder, centrifuge to access stem cell differentiation - Homogenized samples, prepared solutions and used RT-qPCR in order to evaluate gene knockdown - Assisted in RNA transfection to induce gene knockdown - Used flow cytometry analysis to access stem cell differentiation 	

- Assisted in GelMA synthesis, hydrogel cell encapsulation and hydrogel 3D printing under UV light using lyophilizer and single nozzle 3D printer to create spatial cell constructs
- Used confocal microscopy to confirm fluorescent gene knockdown
- Assessed DNA content using gel electrophoresis in order to assess cell growth

Pipetting robot arm

Sep 2022 – Dec 2022

- Led a team of 3 engineering students in development of a robot for medical robotics course
- 3D modeled a 7 DOF robotic arm for pipetting using Autodesk Fusion 360 and SOLIDWORKS
- 3D printed the arm, assembled it using Arduino Mega and programmed using C++ and MATLAB

Smart residential irrigation system

Jan 2023 – Apr 2023

- Designed a remote radio frequency soil moisture sensor for a pre-incubator capstone class
- Soldered a circuit with LoRa radio transceiver and programmed the microcontroller using C++
- Designed sensor enclosure system using Fusion 360 and printed it using MultiJet 3D printer
- Performed sensor testing and calibration in soil and air to set an offset and determine uncertainty

Dental bite block

Sep 2021 – Dec 2021

- Designed an adjustable dental bite block to alleviate temporomandibular joint dysfunction
- Performed engineering analysis and recorded progress in design evolution and evaluation matrix
- Created several engineering drawings and 3D models using Autodesk Fusion 360
- Performed a compression simulation using SOLIDWORKS simulation tools with FEA

PUBLICATIONS and POSTERS

Undergraduate thesis

to be published in May 2024

“Investigation of novel modification of poly(glycerol) dodecanedioate with methacrylic anhydride for biomedical applications”

Breast cancer combinatorial treatment research

Sep 2022 – Dec 2022

- Investigated the combinatorial doxorubicin and curcumin treatment for MDA-MB-231 breast cancer cells and discovered a complex antagonistic relationship between the drugs
- Cultured and treated cells, conducted CCK8 assay to collect data
- Analyzed data using Graphpad Prism 9

EMG motion recognition

Jan 2022 – Apr 2022

- Soldered a circuit to read voltage and filter noise from several EMG sensors
- Programmed the EMG device using C++ and MATLAB and performed hardware validation
- Using RMS and frequency analysis explored correlation of EMG signal with grip force measured with dynamometer and rotation torque with torque meter to achieve forearm motion recognition