

**The Ohio State University  
Curriculum Vitae**

NAME Aleksander Skardal, Ph.D.

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The Ohio State University  
Columbus, OH 43210  
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EDUCATION

2005 Johns Hopkins University  
Baltimore, Maryland  
B.Sc. Biomedical Engineering

2010 Department of Bioengineering  
University of Utah  
Salt Lake City, Utah  
Ph.D.

Research Advisor: Glenn D. Prestwich, Ph.D.

Thesis: *Hyaluronan and Gelatin Biomaterials for Bioprinting Engineered Tissues*

POSTDOCTORAL TRAINING

2010 – 2014 Postdoctoral Fellow, Wake Forest School of Medicine, Wake Forest Institute for Regenerative Medicine.  
Research Advisor: Shay Soker, Ph.D.  
Research Project: *Implementation of biomaterial technologies in regenerative medicine and tissue engineering applications.*

EMPLOYMENT

Academic Appointments

The Ohio State University

2019 – Present Assistant Professor (Tenure Track), Department of Biomedical Engineering

2019 – Present Member, The Ohio State University Comprehensive Cancer Center

Wake Forest School of Medicine

2014 – 2019 Assistant Professor, Wake Forest Institute for Regenerative Medicine

2014 – 2019 Assistant Professor, Department of Biomedical Engineering

2015 – 2019 Assistant Professor, Department of Cancer Biology

2015 – 2019 Member, Comprehensive Cancer Center of Wake Forest University,  
Tumor Progression and Recurrence Program  
2018 – 2019 Assistant Professor, Department of Molecular Medicine and Translational  
Science

### Professional Experience

2003 Intern, AlphaGenics, Rockville, MD.  
Research Project: Data mining biomedical publication databases to create  
nutrient, protein, and gene mechanistic pathways.

2004-2005 Research Assistant – Jan Hoh Lab, Department of Physiology, Johns Hopkins  
School of Medicine, Baltimore Maryland  
*Research Project: Development of a harmonic resonance-based thin film  
biosensor.*

2005-2010 Research Assistant – Prestwich Lab, Center for Therapeutic Biomaterials,  
University of Utah, Salt Lake City, UT  
*Research Project: Synthesis, development, and implementation of hyaluronic  
acid and gelatin-based biomaterials for biofabrication of engineered tissues  
constructs.*

2010-2014 Postdoctoral Fellow – Wake Forest Institute for Regenerative Medicine, Wake  
Forest School of Medicine, Winston-Salem, NC  
*Research Focus: Design and implementation of customized biomaterials in  
tissue engineering and regenerative medicine*

### Professional Interest Groups

The Ohio State University

2019 – Present Member, Cancer Biology Program, The Ohio State University Comprehensive  
Cancer Center

2019 – Present Member, Center of Cancer Engineering, The Ohio State University  
Comprehensive Cancer Center

2019 – Present Founder, Tumor Organoid Interest Group, The Ohio State University  
Comprehensive Cancer Center

Wake Forest School of Medicine

2014-2019 Member, Tumor Microenvironment Interest Group, Wake Forest Baptist Medical  
Center

2015-2019 Member, Drug Discovery Interest Group, Wake Forest Baptist Medical Center  
and Wake Forest University

2015-2019 Member, Brain Tumor Center of Excellence, Comprehensive Cancer Center at  
Wake Forest Baptist Medical Center

2018-2019 Member, Signaling and Biotechnology Program, Comprehensive Cancer Center  
at Wake Forest Baptist Medical Center

2018-2019 Member, Center for Functional Materials, Wake Forest University and Wake  
Forest Baptist Medical Center

2018-2019 Member, Breast Cancer Center of Excellence, Comprehensive Cancer Center at Wake Forest Baptist Medical Center

## ADMINISTRATIVE SERVICE

The Ohio State University

### Departmental Service

2019 – Present Department of Biomedical Engineering, Graduate Research Committee

2020 – Present Department of Biomedical Engineering, Biomedical Engineering Research Committee

Wake Forest School of Medicine

### Institutional Service

2018-2019 Chair, Biomaterials Track Curriculum Committee, Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences

### Departmental Service

2011-2018 Scientific Mentor – Wake Forest Institute for Regenerative Medicine Summer Scholars Research Program

2013-2014 Wake Forest Institute for Regenerative Medicine, All Hands Retreat Committee

2014-2015 Wake Forest Institute for Regenerative Medicine, Faculty Recruitment Committee

2014-2019 Liaison, Graduate Student Program for Introductions of Visiting Faculty Seminars

2016 Course Director – Decellularization Biomaterials Workshop, Regenerative Medicine Essentials Short Course

2016-2017 Wake Forest Institute for Regenerative Medicine, Faculty Recruitment Committee

2017 Course Director – Decellularization Biomaterials Workshop, Regenerative Medicine Essentials Short Course

2017-2019 Faculty Advisor – Weekly Research Progress Update Seminar Series, Wake Forest Institute for Regenerative Medicine Summer Scholars Research Program

2018 Course Founder and Director – Organ-on-a-Chip/Body-on-a-Chip and Supporting Technologies, Regenerative Medicine Essentials Short Course

2018 Judge, Medical Student Research Program, Wake Forest School of Medicine

## EXTRAMURAL APPOINTMENTS AND SERVICE

### Funding Agency Reviewer

Human Frontier Science Program (October 2014)

Health Research Board (2015)

NSF: Graduate Research Fellowship Program, Bioengineering (2015)

European Research Council (2017)

French National Alliance for Life and Health Sciences (AVIESAN)/French National Cancer Institute (INCa) (2017)

NIH NCI Cancer Tissue Engineering Collaborative – Special emphasis panel ad hoc reviewer (2017)

NSF: Graduate Research Fellowship Program, Bioengineering (2018)

NIH NHLBI – Cardiovascular and Pulmonary Research on e-Cigarettes – Special emphasis panel ad hoc reviewer (2018)

Austrian Science Fund (2018)

NSF: Graduate Research Fellowship Program, Bioengineering (2019)

NIH Bioengineering of Neuroscience, Vision and Low Vision Technologies Study Section – ad hoc reviewer (2020)

Netherlands Organisation for Scientific Research (2020)

### Editorial Boards

Bioprinting  
Microphysiological Systems

### Journal Reviewer

Biofabrication  
Biomedical Materials  
Journal of Physics: Condensed Matter  
Advanced Functional Materials  
Small  
Journal of Biomedical Materials Research Part A  
Stem Cells Translational Medicine  
Journal of Biomaterials Applications  
Acta Biomaterialia  
Chemical Communications  
RSC Advances  
Stem Cell Research  
Journal of Micromechanics and Microengineering  
Materials  
Analytical Chemistry  
PLOS One

Biotechnology and Bioengineering  
Tissue Engineering  
Bioprinting  
Nature Protocols  
Lab-on-a-Chip  
Journal of Biomaterials Applications  
Nanoscale  
Analytical Chemistry  
ACS Biomaterials Science & Engineering  
Scientific Reports  
Advanced Healthcare Materials  
Biomaterials  
Biotechnology Advances  
Science Advances  
Nature Biomedical Engineering

### Conference Activities

Abstract Reviewer, 2015 BMES Annual Meeting, Cancer Technologies Track

Abstract Reviewer, 2016 BMES Annual Meeting, Biomaterials Track

Abstract Reviewer, 2016 BMES Annual Meeting, Undergraduate Abstracts

Abstract Reviewer, 2016 Biofabrication Conference

Session Chair and Organizer, 2016 Biofabrication Conference, Microphysiological Systems

Award Committee, Young Investigator Award, 2016 Biofabrication Conference

Abstract Reviewer, 2016 Tissue Engineering and Regenerative Medicine International Society (TERMIS) Annual Meeting

Award Committee, WFIRM Young Investigator Award, 2016 TERMIS AM Conference

Session Chair, 2016 BMES Annual Meeting, *Engineered Models of Glioma and the Tumor Microenvironment*

Session Chair and Organizer, 2016 Tissue Engineering and Regenerative Medicine International Society (TERMIS) Annual Meeting, *Tissue Organoids for In Vitro Screening Session*

Session Chair and Organizer, 2017 Tissue Engineering and Regenerative Medicine International Society (TERMIS) Annual Meeting, *Cancer Session; Tissue Chips and Organoids Session*

Award Committee, WFIRM Young Investigator Award, 2017 TERMIS AM Conference

Abstract Reviewer, 2018 BMES Annual Meeting, Biomaterials Track

Award Committee, WFIRM Young Investigator Award, 2018 TERMIS World Congress

Session Chair, 2019 World Stem Cell Summit, Bioengineering Track, Bioprinting and Bioinks

Chair, Young Scientist Forum, and Member, Conference Organizing Committee, Biofabrication 2019 Conference.

## PROFESSIONAL MEMBERSHIPS AND SERVICE

### Service

2016	Perinatal Stem Cell Society Web Content Manager
2017	International Society for Biofabrication Web Content Committee

### Memberships

2008-Present	Tissue Engineering and Regenerative Medicine International Society (TERMIS)
2007-2010, 2018-2019	Society for Biomaterials
2015-2019	Biomedical Engineering Society
2016-2017	Perinatal Stem Cell Society
2016-Present	International Society for Biofabrication

## HONORS AND AWARDS

2006	University of Utah Graduate School Student Travel Award
2010	Society for Biomaterials Achievement Recognition
2011	Tissue Engineering and Regenerative Medicine International Society SYIS Session Co-Chair – “Scaffold Design”
2012	Best Podium Presentation Award – North Carolina Tissue Engineering and Regenerative Medicine Society 14 <sup>th</sup> Annual Conference
2013	Golfers Against Cancer Research Funding Award
2013	Edison Awards “Game Changer Award” for Bioprinters for Regenerative Medicine in Science/Medical category
2013	Tissue Engineering and Regenerative Medicine International Society SYIS Session Co-Chair – “Biomaterials for Cell Delivery & Recruitment”
2014	1 <sup>st</sup> Place – Wake Forest Institute for Regenerative Medicine 2014 Retreat Poster Session
2014	Wake Forest Institute for Regenerative Medicine – Promoting Innovative Discoveries Funding Award
2015	Wake Forest Baptist Medical Center Research Excellence Award
2015	Comprehensive Cancer Center at Wake Forest Baptist Medical Nominee for the V Foundation for Cancer Research Award
2015	2015 IQ Consortium and AAALAC International Global 3Rs Award - for non-animal cancer models

2015	Wake Forest Baptist Medical Center Nominee for the Pew Biomedical Scholar Program Award
2016	Clinical and Translational Science Institute Academy Scholar – Wake Forest School of Medicine
2017	Wake Forest Baptist Medical Center Research Excellence Award
2018	Wake Forest Baptist Medical Center Research Excellence Award

## GRANT FUNDING

### Currently Funded Grants

**Grant Number:** 1 R21 CA229027-01

**Source:** NIH NCI IMAT

**Title:** Predicting Tumor Heterogeneity Evolution After Therapy in Patient-Derived Ex Vivo Glioblastoma Organoids

**Role:** PI

**Performance Period:** 8/09/2018 – 7/31/2021

**Total Direct Costs:** \$400,000

**Time Commitment:** 1.8 calendar months (15% effort)

**Goal:** Glioblastoma (GBM) is a lethal, incurable form of cancer in the brain that universally recurs more aggressively even with maximally aggressive surgery followed by chemoradiotherapy. These tumors are extremely heterogenous with regions of genetically distinct subclones that evolve differently over time and in response to treatments making designing effective therapies for each individual patient difficult. Here we propose to deploy a patient-specific ex vivo tumor-on-a-chip system to analyze tumor heterogeneity and drift over time to predict clonal evolution for patients, which could subsequently have substantial impact on treatment decisions.

**Grant Number:** n/a

**Source:** XCELL Biologix

**Title:** Amnion Membrane Compositions and Methods Development Studies

**Role:** MPI (Skardal and Murphy)

**Performance Period:** 11/15/2017 – 11/15/2020

**Annual Direct Costs:** \$152,303

**Time Commitment:** 1.2 calendar months (10% effort)

**Goal:** Development of product form factors for delivering amnion membrane-based biomaterials to wounds in a user-friendly manner as a commercial product.

### Past Grant History

**Grant Number:** W81XWH-15-9-001

**Source:** s/RegenMed Development Organization (ReMDO) via MTEC

**Title:** Development of a Universal Bioink with Tunable Mechanical Properties for Regenerative Medicine Additive Manufacturing of Clinical Products

**Role:** PI

**Performance Period:** 11/04/2016 – 10/30/2021

**Annual Direct Costs:** \$637,486

**Time Commitment:** 1.8 calendar months (15% effort)

**Goal:** To develop and engineer a modular system allowing for customization of bioink biomaterials for bioprinting that can be deployed in all common bioprinting hardware modalities and be tailored to create

and support the majority of the tissue types in the human body – both for regenerative applications and organoid technologies for diagnostics, personalized medicine, and drug development.

**Grant Number:** n/a

**Source:** Wake Forest Breast Cancer Center of Excellence

**Title:** An Immuno-Organoid Platform for ex vivo Testing of Novel Immunotherapies for TNBC Patients

**Role:** PI

**Performance Period:** 1/01/2019 – 12/31/2019

**Annual Direct Costs:** \$100,000

**Time Commitment:** 0.6 calendar months (5% effort)

**Goal:** Utilize parallel murine models and murine organoid triple negative breast cancer models to direct immune-enhancing of patient-derived breast cancer tumor organoids and subsequent techniques to reduce immune-suppression in triple negative breast cancer, enabling immune checkpoint blockade therapies.

**Grant Number:** n/a

**Source:** Myeloma Crowd Foundation

**Title:** Rapid and Personalized Prediction of Myeloma Response to Chemotherapy Using CD Organoids

**Role:** Co-PI

**Performance Period:** 1/01/2019 – 12/31/2019 (option to renew)

**Annual Direct Costs:** \$150,000

**Time Commitment:** 1.2 calendar months (10% effort)

**Goal:** Develop supportive microenvironment conditions to support difficult to maintain ex vivo myeloma cell populations. Deploy organoids created in personalized chemosensitivity screening studies and correlate with patient outcomes.

**Grant Number:** n/a

**Source:** Wake Forest Clinical and Translational Science Institute

**Title:** A tunable thixotropic hydrogel bioink for bioprinting of functional tissue analogs

**Performance Period:** 4/01/2018 – 3/31/2019

**Role:** PI

**Annual Direct Costs:** \$40,000

**Time Commitment:** no salary

**Goal:** We propose to employ, query, and quantify the contributions of inter-polymer/protein forces (hydrogen bonding versus covalent bonding) in generating thixotropic hydrogel bioinks, subsequently assessing how these forces influence bioprinting parameters during tissue construct biofabrication. We will characterize and optimize contributions of non-covalent, hydrogen bond-based interactions within thixotropic extracellular matrix (ECM)-based hydrogel bioinks. Subsequently we will employ and validate bioinks by bioprinting viable and functional tissue constructs (liver construct and heart patch).

**Grant Number:** n/a

**Source:** Comprehensive Cancer Center at Wake Forest Baptist

**Title:** Patient tumor-derived tumor-on-a-chip technology for determining metastatic potential and response to chemotherapy prior to initiation of treatment

**Role:** PI

**Performance Period:** 5/01/2017 – 11/30/2019

**Annual Direct Costs:** \$10,000

**Time Commitment:** no salary

**Goal:** Employ genetic screening to identify drugable biomarkers in patient gastrointestinal tumor biopsies. Use cells from these biopsies to create 3D tumor organoids with which to test biomarker-driven drugs for efficacy for each patient case.

**Grant Number:** 2017-614-001

**Source:** Medical Technology Enterprise Consortium (MTEC)

**Title:** Pre-clinical Assessment of Bioprinted Human Skin for Wound Healing and Skin Regeneration

**Role:** Co-I

**Performance Period:** 11/28/2017 – 11/19/2018



**Annual Direct Costs:** \$193,548

**Time Commitment:** 0.84 calendar months (7% effort)

**Goal:** The overall goal of the project is to bioprint full-thickness human skin with hair follicle appendages, microvasculature, immune cells and pigmentation and use it as a skin graft in immunodeficient rats.

**Grant Number:** 1 R33 CA202822-01

**Source:** NIH

**Title:** Bioengineered Lung Tumor Organoids for Development of Personalized Medicine

**Role:** Co-I

**Performance Period:** 04/12/2016 – 03/31/2019

**Annual Direct Costs:** \$248,983

**Time Commitment:** 0.96 calendar months (8% effort)

**Goal:** Personalized oncology, whereby tumor DNA is sequenced to identify actionable gene mutations, is poised to become a standard process in cancer treatment, but is dependent on the availability of sufficient amounts of intact tumor cell DNA. We propose to bioprint lung organoids that will recapitulate the in vivo lung microenvironment in order to successfully expand a small number of freshly isolated lung cancer cells in vitro.

**Grant Number:** W81XWH-13-2-0054

**Source:** DOD USAMRAA

**Title:** Amniotic Fluid-Derived Stem Cells for Enhanced Wound Healing

**Role:** Co-I

**Performance Period:** 09/23/2013 – 09/22/2019 (NCE)

**Annual Direct Costs:** \$0

**Time Commitment:** 2.64 calendar months (22% effort)

**Goal:** The goal of this work is to develop a method that will permit the use of allogeneic source of fetal stem cells, and novel hydrogels for clinical management of burn wounds, allowing wound healing treatment to achieve fast and comprehensive wound coverage that results in functional and cosmetically superior skin.

**Grant Number:** 1 R21 CA28933-01A1

**Source:** NIH

**Title:** Development of a CF10 Predictive Gene Signature in CRC Organoids

**Role:** Co-I

**Performance Period:** 02/02/2018 – 01/31/2020

**Annual Direct Costs:** \$130,000

**Time Commitment:** 0.96 calendar months (8% effort)

**Goal:** This project investigates whether a new polymeric fluoropyrimidine, CF10, is effective for treating colorectal cancer (CRC) that is non-responsive to 5-fluorouracil (5-FU). Our preliminary studies show CF10 is much more potent than 5-FU and is effective in models of CRC sub-types that are non-responsive to 5-FU. We will systematically evaluate response of CRC cells and patient tumors using novel tumor organoid technology to establish in what CRC sub-types CF10 treatment provides a therapeutic advantage.

**Title:** INtegrated Organoid Testing System, (INGOTS)

**Role:** Co-I

**Supporting Agency:** Defense Threat Reduction Agency/SPAWAR

**Performance Period:** 03/28/2013 – 10/01/2018

**Level of Funding (total costs):** \$17,750,269

**Goals:** INGOTS will be comprised of four interconnected microscale bioreactors, each containing fully-functional, three dimensional (3D) human tissue constructs (organoids). INGOTS will allow for the application of test agents at the individual organoid or whole body system level and will employ both commercially available human cells and blood substitutes.

**Title:** Patient-specific 3D tumor organoids for glioblastoma multiforme precision medicine

**Role:** Principal Investigator

**Supporting Agency:** Wake Forest Brain Tumor Center of Excellence

**Performance Period:** 05/01/2016 – 06/30/2017

**Level of Funding (total costs):** \$30,000

**Goals:** The goal is to demonstrate and implement a GBM organoid system within the framework of clinical precision medicine, by demonstrating biomarker- and mutation-based drug targeting in 3D patient-derived GBM tumor models. To accomplish this goal, patient-derived GBM organoids will be fabricated, and genetic profiles will be used to inform customized drug screening. These customized GBM treatments will be assessed for responsiveness using quantitative analysis of tumor growth, reduction, and migration in 3D space, and viability/apoptosis.

**Title:** Patient-specific Bioengineered Lung Tumor Organoids to support personalized medicine

**Role:** Co-Investigator

**Supporting Agency:** Center for Public Health Genomics

**Performance Period:** 08/01/2015 – 08/01/2016

**Level of Funding (total costs):** \$25,000

**Goal:** To employ bioprinted lung organoids to support growth of non-small cell lung cancer biopsies in order to increase cellular yield that can be used for genetic screens for precision medicine.

**Title:** A Three-Dimensional Liver Microtumor Organoid Platform for Anti-Cancer Drug Development

**Role:** Principal Investigator

**Supporting Agency:** Golfers Against Cancer

**Performance Period:** 03/01/2013 – 03/01/2015

**Level of Funding (total costs):** \$40,000

**Goals:** In a rotating bioreactor, liver organoids will be created, inside of which reside metastatic colon carcinoma cells. In this 3-D environment, cancer cells behave as they would when in the body, providing a superior human cell-based in vitro testing platform for screening potential drug candidates in comparison to traditional 2-D cultures or animals.

**Title:** CTSI Translational Pilot - A patient-specific tumor-on-a-chip platform for screening precision medicine-driven therapies

**Role:** Principal Investigator

**Supporting Agency:** Wake Forest Baptist Medical Center – Clinical and Translational Science Institute

**Performance Period:** 02/01/2016 – 04/01/2017

**Level of Funding (total costs):** \$40,000

**Goals:** To demonstrate the utility of using tumor models created using cells from actual patient tumor biopsies to screen drug therapies for a given patient, thereby identifying the most effective treatment. Single colorectal cancer tumor organoids are created within colon constructs and screened using drugs commonly employed against colorectal cancer.

**Title:** WFIRM – Promoting Innovative Discoveries – Intramural Pilot Funding Program

**Role:** Principal Investigator

**Supporting Agency:** Wake Forest Institute for Regenerative Medicine

**Performance Period:** 10/01/2014 – 10/01/2015

**Level of Funding (total costs):** \$25,000

**Goals:** To merge microfluidic device technology with photo-patterned hydrogel biomaterials to create a high-throughput system of 3-D tumor and tissue organoids for drug testing and metastasis exploration. Initial pilot work focuses on colon carcinoma metastases in liver organoids. Post-pilot work will expand to other tissue/tumor types and the biological mechanisms that play important roles in cancer that can potential therapeutic targets for intervention.

## PATENTS

1. Welker ME, Skardal A, Weissenfluh AN, and Banks S. Hydrogen-bonding compounds, compositions comprising the same, and methods of preparing and using the same. PCT/US2017/058531.
2. Skardal, A and Clark C. Immersion Deposition Methods and Compositions for Use in the Same. US Utility Patent No. 62/715,548.

3. Skardal, A and Clark C. Compositions Including Gelatin Nanoparticles and Methods of Use Thereof. US Utility Patent No. 62/718,662.
4. Skardal, A and Votanopoulos, K. Patient-Specific Immune Enhanced Organoids and Methods of Making and Using the Same. US Provisional Patent Application No. 62/715548.
5. Skardal, A and Votanopoulos, K. Organoids Related to Immunotherapy and Methods of Preparing and Using the Same. PCT/US2019/016236.
6. Skardal, A and Sivakumar, H. Compositions, Cell Constructs and Methods of Making and Using the Same. PCT/US2017/056558
7. Skardal, A. Bioink Compositions and. Methods of Preparing and Using the Same. US Utility Patent. No. 16/156535.
8. Skardal A, Porada C, Almeida-Porada G. Niches-On-a-Chip. PCT/US2018/044791.
9. Skardal, A., Shupe, T., and Atala, A. Multi-Organ "Body on a Chip" Apparatus Utilizing a Common Media. PCT/US2017/055823.
10. Skardal, A. Cancer Modeling Platforms and Methods of Using the Same. PCT/US2017/045277.
11. Skardal, A. Evaluation of Two Novel Colorectal Cancer Modeling Platforms. WFIRM 17-901.
12. Skardal, A. Methods and Apparatus for Modeling Metastasis In Vitro. PCT/US2016/054611.
13. Skardal, A. Spontaneously Beating Cardiac Organoid Constructs and Integrated Body-on-Chip Apparatus Containing the Same. PCT/US2016/054607.
14. Skardal A, and Soker S. Tissue Mimicking Hydrogel Compositions for Biofabrication. PCT/US2015/055699.
15. Murphy S, Skardal A, and Atala A. Amniotic Membrane Powder and Methods of Making. PCT/US15/053571.
16. Murphy S, Skardal A, and Atala A. Amniotic Membrane Hydrogel and Methods of Making. Patent Application No. 14/449,867.
17. Murphy S, Skardal A, and Atala A. Amniotic Membrane and Its Use In Wound Healing and Tissue Engineering Constructs. PCT/US13/058940.
18. Zhang Y, Atala A, Soker S, and Skardal A. Tissue-Specific Extracellular Matrix With or Without Tissue Protein Components for Cell Culture. US Utility Patent No. 61/412,193.
19. Skardal A, Zhang, J, and Prestwich GD. Crosslinked Hydrogels and Methods of Making and Using Thereof. EP Patent 2,523,656. 2012.
20. Skardal A, Zhang, J, and Prestwich GD. Crosslinked Hydrogels and Methods of Making and Using Thereof. Patent application 13/522,032.
21. Prestwich GD, Skardal A, and Zhang J. Hydrogels Crosslinked with Gold Nanoparticles. EP Patent 2,384,439. 2011.
22. Prestwich GD, Skardal A, and Zhang J. Hydrogels Crosslinked with Gold Nanoparticles and Methods of Making and Using Thereof. Provisional patent application 61/148,526, PCT application PCT/US09/68470.
23. Prestwich GD, Skardal A, and Zhang J. Modified Macromolecules and Methods of Making and Using Thereof. EP Patent 2,399,940. 2011.
24. Prestwich GD, Skardal A, and Zhang J. Modified Macromolecules and Methods of Making and Using Thereof. US Patent Application No. 12/764,466. 2010.
25. Prestwich GD, Skardal A, and Zhang J. Tetrahedral Polyethylene Glycol Tetracrylates - Crosslinked Hyaluronan-Gelatin Hydrogels. Provisional patent application submitted.
26. Prestwich GD, Zhang J, and Skardal A. Fall-Apart Composites and Methods of Use Thereof. Provisional patent application 61/051,698.
27. Prestwich GD, Zhang J, and Skardal A. Printable Photocrosslinkable Hydrogels for Tissue Engineering and Tumor Xenografts. Provisional patent application submitted.

## BIBLIOGRAPHY

### Peer-Reviewed Publications

1. Liu Y, Skardal A, Shu XZ, and Prestwich GD. (2008). Prevention of peritendinous adhesions using a hyaluronan-derived hydrogel film following partial-thickness flexor tendon injury. Journal of Orthopaedic Research, 26(4), 562-569.

2. Zhang J, Skardal A, and Prestwich GD. (2008). Engineered extracellular matrices with cleavable crosslinkers for cell expansion and easy cell recovery. *Biomaterials*, 29(34), 4521-4531
3. Skardal A, Zhang J, McCoard L, Xu X, Oottamasathien S, and Prestwich GD. (2010). Photocrosslinkable hyaluronan-gelatin hydrogels for two-step bioprinting. *Tissue Engineering Part A*, 16(8), 2675-85.
4. Skardal A, Zhang J, and Prestwich GD. (2010). Bioprinting vessel-like constructs using hyaluronan hydrogels crosslinked with tetrahedral polyethylene glycol tetracrylates. *Biomaterials*, 31(24), 6173-81.
5. Skardal A, Zhang J, McCoard L, Oottamasathien S, and Prestwich GD. (2010). Dynamically - crosslinked gold nanoparticle - hyaluronan hydrogels. *Advanced Materials*, 22, 4736-4740.
6. Skardal A, Sarker S, Nickerson C, and Prestwich GD. (2010). Development of hyaluronan hydrogel-coated microcarriers for generation of three-dimensional tissue models in a rotating wall vessel bioreactor. *Biomaterials*, 31(32), 8426-35.
7. Oottamasathien S, Jia W, McCoard L, Slack S, Zhang J, Skardal A, Job K, Kennedy TP, Dull RO, Prestwich GD. (2011). A murine model of inflammatory bladder disease: cathelicidin peptide induced bladder inflammation and treatment with sulfated polysaccharides. *Journal of Urology*, 186, 1684-92.
8. Skardal A, Smith L, Bharadwaj S, Atala A, Soker S, and Zhang Y. (2012) Tissue specific synthetic ECM hydrogels for in vitro maintenance of hepatocyte function. *Biomaterials*. 33(18), 4565-4575.
9. Skardal A, Mack D, Kapetanovic E, Atala A, Jackson JD, Yoo J, and Soker S. (2012) Bioprinted amniotic fluid-derived stem cells accelerate wound healing of large skin wounds. *Stem Cells Translational Medicine*. 1(11), 792-802. Featured on journal cover.
10. Murphy S\*, Skardal A\*, and Atala A. (2013) Evaluation of hydrogels for bioprinting applications. *Journal of Biomedical Materials Research*. 101(1), 272-84. (\*These authors contributed equally.)
11. Skardal A, Mack D, Atala A and Soker S. (2013) Reduced substrate elasticity induces a mobile phenotype and recovers therapeutic potential of amniotic fluid-derived stem cells. *Journal of Mechanical Behavior of Biomedical Materials*. 17, 307-316.
12. Park AH, Hoyt D, Britt D, Chase S, Tansavatdi D, Hunter L, McGill L, Sheng X, Skardal A, and Prestwich GD. (2013) Crosslinked hydrogel and polyester resorbable ventilation tubes in a chinchilla model. *The Laryngoscope*. 123(4), 1043-8.
13. Markert CD, Guo X, Skardal A, Wang Z, Bharadwaj S, Zhang Y, Bonin K, and Guthold M. (2013) Characterizing the micro-scale elastic modulus of hydrogels for use in regenerative medicine. *Journal of Mechanical Behavior of Biomedical Materials*. 27, 115-127.
14. Niu G, Choi J, Wang Z, Skardal A, Giegengack M, and Soker S. (2014) Heparin-modified gelatin scaffolds for human corneal endothelial cell transplantation. *Biomaterials*. 35(13), 4005-14.
15. Skardal A and Atala A. *Biomaterials for Integration with 3-D Bioprinting*. Invited review for *Scaffolds for Regenerative Medicine Special Issue of the Annals of Biomedical Engineering*. Available online ahead of print.
16. Skardal A, Devarasetty M, Rodman C, Atala A and Soker S. Liver-tumor hybrid organoids for modeling tumor growth and drug response in vitro. *Annals of Biomedical Engineering*. 2015.
17. Skardal A, Devarasetty M, Kang HK, Mead I, Bishop C, Shupe T, Lee SJ, Jackson J, Yoo J, Soker S, and Atala A. "A hydrogel bioink toolkit for mimicking native tissue biochemical and mechanical properties in bioprinted tissue constructs. *Acta Biomaterialia*. 2015. (Corresponding Author)
18. Deegan DB, Zimmerman C, Skardal A, Atala A, Shupe TD. Stiffness of hyaluronic acid gels containing liver extracellular matrix supports human hepatocyte function and alters cell morphology. *Journal of Mechanical Behavior of Biomechanical Materials*. 2015. 55; 87-103.
19. Skardal A, Devarasetty M, Soker S, and Hall AR. In situ patterned micro 3-D liver constructs for parallel toxicology testing in a fluidic device. *Biofabrication*. 2015 Sep 10. 7(3), 031001. (Corresponding Author)
20. Skardal A, Devarasetty M, Forsythe SD, Atala A, and Soker S. A reductionist metastasis-on-a-chip platform for in vitro tumor progression modeling and drug screening. *Biotechnology and Bioengineering*. 2016. (Corresponding Author)
21. Skardal A, Murphy S, Crowell K, Mack D, Atala A, and Soker S. A tunable hydrogel system for long-term release of cell-secreted cytokines and bioprinted in situ wound cell delivery. *Journal of Biomedical Materials Research Part B: Applied Biomaterials*. 2016. Jun 28. (Corresponding Author).

22. Skardal A, Devarasetty M, Kang HW, Seol YJ, Forsythe SD, Bishop C, Shupe T, Soker S, Atala A. Bioprinting cellularized constructs using a tissue-specific hydrogel bioink. *Journal of Visualized Experiments*. 2016. 110. (Corresponding Author).
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## PRESENTATIONS AT PROFESSIONAL MEETINGS

2006:

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- Skardal A and Prestwich G. Synthetic Extracellular Matrices as Tools for Bioprinting. [Podium Presentation] 3rd Annual Mountain West Biomedical Engineering Conference. Park City, UT.

2008:

- Skardal A and Prestwich GD. Extracel™-Coated Microbeads for Cell Culture, Recovery, and Formation of Spherical Micro Tissues. [Poster] The TERMIS North America 2008 Annual Conference and Exposition. San Diego, CA.
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2009:

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2011:

- Skardal A, Smith L, Bharadwaj S, Zhang Y, and Soker S. Tissue Specific Synthetic ECM Hydrogels for *in vitro* Maintenance of Hepatocyte Function. [Podium Presentation] The TERMIS North America 2011 Annual Conference and Exposition. Houston, TX.
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- Skardal A, Devarasetty M, and Soker S. Three-Dimensional Organoid Systems for Modeling Colon Carcinoma Metastasis and Anti-Cancer Drug Development. [Poster] 2013 TERMIS Americas Annual Conference and Exposition. Atlanta, GA.
- Skardal A, Murphy S, Mack D, and Soker S. Delivery of Amniotic Fluid-Derived Stem Cells in a Heparin-Functionalized Hyaluronic Acid Hydrogel Gel Accelerates Skin Regeneration. [Poster] 2013 TERMIS Americas Annual Conference and Exposition. Atlanta, GA.
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## 2015:

- Skardal A. Engineering 3-D in vitro tumor model systems for mechanistic and diagnostic applications. Tumor Microenvironment Interest Group [Internal]. June 16, 2015. Winston-Salem, NC.
- Aleksander Skardal. Engineered tumor models for drug screening and personalized medicine. Brain Tumor Center of Excellence Seminar Series. Wake Forest Baptist Medical Center and Wake Forest School of Medicine. March 22, 2016.

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- 2016:
- May 3, 2016. "Bioprinting and Biomaterial-based Solutions for Skin Regeneration", American Burn Association, Las Vegas, NV.
  - June 16, 2016. "Bioengineered 3D Tissue and Tumor Models for Drug Screening and Personalized Medicine", World Preclinical Congress – 3D Cellular Models, Boston, MA.
  - July 12, 2016. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: The Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.

- September 14, 2016. "Metastasis-on-a-Chip", Swiss Laboratory Animal Science Association SGV 2016 Meeting, Basel, Switzerland.
- October 31, 2016. "Hydrogel bio-ink biomaterials in bioprinting and biofabrication", Biofabrication 2016, Winston-Salem, NC.
- Aleksander Skardal. A bioengineered multi-organoid body-on-a-chip platform for drug screening. Biofabrication 2016, Winston-Salem, NC. October 2016.
- Steven Forsythe, Katherine McMurray, Naren Mehta, Mahesh Devarasetty, and Aleksander Skardal. A tumor-on-a-chip platform for screening precision medicine-driven therapies. Biofabrication 2016, Winston-Salem, NC. October 2016.
- Katherine McMurray, Naren Mehta, Julio Aleman, Steven Forsythe, Mahesh Devarasetty, and Aleksander Skardal. A Tumor-on-a-Chip Microfluidic Device for Capturing and Quantifying Metastasizing Tumor Cells. Biofabrication 2016, Winston-Salem, NC. October 2016.
- Steven Forsythe, Naren Mehta, Angela Alistar, Adam Hall, and Aleksander Skardal. A tumor-on-a-chip platform for screening precision medicine-driven therapies. 2016 Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.
- Hemamylammal Sivakumar, Mahesh Devarasetty, and Aleksander Skardal. An In Vitro Model of Glioblastoma Multiforme. 2016 Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.
- Mahesh Devarasetty, Steven Forsythe, Sean Murphy, Thomas Shupe, Sang Jin Lee, John Jackson, James Yoo, Shay Soker, Colin Bishop, Anthony Atala, and Aleksander Skardal. A bioengineered multi-organoid body-on-a-chip platform for advanced drug screening. 2016 Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.
- Julio Aleman, Yu Shrike Zhang, Aleksander Skardal, and Ali Khademhosseini. Lego-inspired organ-on-a-chip gelatin methacryloyl microfluidic system. 2016 Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.
- Julio Aleman and Aleksander Skardal. Multiple Organ-on-a-Chip platform for Metastasis Dynamic Studies. 2016 Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.
- Shiny Amala Priya Rajan, Parker Hambright, Aleksander Skardal, and Adam, R Hall. Microfluidic device for motility and biochemical assessment in parallel drug testing. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016
- Julio Aleman, Yu Shrike Zhang, Aleksander Skardal, and Ali Khademhosseini. Lego-inspired organ-on-a-chip gelatin methacryloyl microfluidic system. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016
- Julio Aleman and Aleksander Skardal. Multiple Organ-on-a-Chip platform for Metastasis Dynamic Studies. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016
- Steven Forsythe, Naren Mehta, Angela Alistar, Adam Hall, and Aleksander Skardal. A tumor-on-a-chip platform for screening precision medicine-driven therapies. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016

- Hemamylammal Sivakumar, Mahesh Devarasetty, and Aleksander Skardal. An In Vitro Model of Glioblastoma Multiforme. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016
- Mahesh Devarasetty, Steven Forsythe, Sean Murphy, Thomas Shupe, Sang Jin Lee, John Jackson, James Yoo, Shay Soker, Colin Bishop, Anthony Atala, and Aleksander Skardal. A bioengineered multi-organoid body-on-a-chip platform for advanced drug screening. Tissue Engineering and Regenerative Medicine Society Annual Meeting. San Diego, CA. December 2016

## 2017:

- March 4, 2017. "Biofabrication of Tissue Constructs for Drug Screening, Disease Models, and Personalized Medicine", Regenerative Medicine Workshop, Hilton Head, SC.
- April 6, 2017. "Biofabricated Tissue and Tumor Organoid Systems for Disease Modeling, Drug and Toxicology Screening, and Personalized Medicine", Providence College, Providence, RI.
- June 6, 2017. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: From the Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.
- December 5, 2017. Mazzocchi, A., S. Rajan, K. Votanopoulos, A. Hall, and A. Skardal. "Primary Patient Mesothelioma Organoids for Genetic Mutation-Driven Experimental 3-Deazaneplanocin A Treatment." Tissue Engineering and Regenerative Medicine – Americas. Charlotte, NC.
- December 4, 2017. Mazzocchi, A., R. Huntwork, S. Soker, and A. Skardal. "Hyaluronan-Collagen Type I Hybrid Bioink for 3D Printed Microenvironments." Tissue Engineering and Regenerative Medicine International Society - Americas. Charlotte, NC.
- Mazzocchi, A., K. Votanopoulos, S. Soker, and A. Skardal. "Primary Patient Tumor Organoids for Personalized Drug Treatment." Tissue Engineering and Regenerative Medicine International Society – Americas. Charlotte, NC. 3 Dec 2017.
- Mazzocchi, A., K. Votanopoulos, S. Soker, and A. Skardal. "Primary Patient Tumor Organoids for Personalized Drug Treatment." North Carolina Tissue Engineering and Regenerative Medicine Society. Winston-Salem, NC. 10 Nov 2017.
- Mazzocchi, A., K. Votanopoulos, S. Soker, and A. Skardal. "Primary Patient Tumor Organoids for Personalized Drug Treatment." Biomedical Engineering Society Annual Meeting. Phoenix, AZ. 12 Oct 2017.
- Mazzocchi, A., R. Huntwork, S. Soker, and A. Skardal. "Collagen-I Hybrid Bioink for 3D Printed Microenvironments." Biomedical Engineering Society Annual Meeting. Phoenix, AZ. 12 Oct 2017.

## 2018:

- April 13, 2018. Aleksander Skardal. "Development of a Universal Bioink Platform Technology for Cross-Platform Compatibility Across Bioprinter Hardware and Support of Multiple Tissue Construct Types." Society for Biomaterials 2018 Annual Meeting.
- May 2, 2018. Aleksander Skardal. "Universal Bioink for Accelerating the Realization of Biomanufacturing of Tissue Products" Wake Forest Baptist Medical Center's Dean's Symposium Seminar Series.

- Mazzocchi, A., A. Skardal, and S. Soker. "Patient Derived Lung Cancer Model for the Study of Disease and Drug Response." NIH NIBIB Training Grantees Meeting. Bethesda, MD. 21-22 June 2018.
- Mazzocchi, A., A. Skardal, and S. Soker. "Characterization of Laminin and Fibronectin Driving Matrix Remodeling Kinetics in Liver Models." SBES Symposium. Winston-Salem, NC. 9 May 2018.
- Mazzocchi, A., A. Skardal, and S. Soker. "Characterization of Laminin and Fibronectin Driver Matrix Remodeling Kinetics in Liver Models." Society for Biomaterials. Atlanta, GA. 13-14 Apr 2018.
- Huntwork, R.C., Mazzocchi, A., Sivakumar, H., Clark, C., Aleman, J., Devarasetty, M., and Skardal, A. "Development of a Universal Bioink Technology for Cross-Platform Compatibility Across Bioprinter Hardware and Support of Multiple Tissue Construct Types for Tissue Biomanufacturing." 2018 Military Health System Research Symposium. Kissimmee, FL. 20-23 Aug.
- Clark, C., Sivaumar, H., and Skardal A. "Development of a Thixotropic Collagen—Hyaluronic Acid Hydrogel for Improved Bioprinting." 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.
- Maloney, A., Clark, C., Mazzocchi, A., and Skardal A. "Immersion bioprinting organoid constructs in multi-well plates for increasing throughput of 3D drug screening." 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.
- Waits, C., Mazzocchi, A., Sivakumar, H., Sergeant, S., Skardal, A., and Rahbar, E. "Development of Liver Organoids to Study FADS and ELOVL Gene-Diet Interactions." 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.
- Mazzocchi, A., Skardal, A., and Soker, S. "Primary Patient Lung Cancer Model for Study of Disease and Drug Treatment Response." 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.
- Rivas Duarte, F., Hall, A., Rahbar, E., Skardal, A., Zahid, O., Reesink, H., and DeAngelis, P. "Analysis of Physiological Hyaluronan Size Distribution with a Solid-state Nanopore Sensor." 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.
- Ekem, L., Sivakumar, H., Waits, C., Skardal, A., and Rahbar, E. "Development of a Dynamic 3D Blood Brain Barrier Model" 2018 Biomedical Engineering Society Annual Meeting. Atlanta, GA. 17-20 Oct 2018.

2019:

- Skardal, A. "Development of a Universal Bioink Technology for Multi-Modality Bioprinting Compatibility and Support of Multiple Tissue Construct Types." Biofabrication 2019. Columbus, OH.
- Skardal, A. "Model of Patient-Specific Immune Enhanced Tumor Organoids for Immunotherapy Screening." Biofabrication 2019. Columbus, OH.
- Nairon, K and Skardal, A. "Evaluation of Laminin and Fibronectin Impact on Metastasis in a Tumor-on-a-Chip Microfluidic Platform." Biofabrication 2019. Columbus, OH.
- DePalma, T and Skardal, A. "Development Of An In Vitro Functional 3D Blood Brain Barrier Model For Use In A Brain Microfluidic Model." Biofabrication 2019. Columbus, OH.

- Forsythe, S, Sivakjumar, H, Mazzocchi, A, Aleman, J, Rajan, S, Hall A, Strowd, R, Votanopoulos, K, and Skardal, A. "Personalized chemotherapy and immunotherapy drug screening in ex vivo patient-specific 3D micro-tumor constructs." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Votanopoulos, K, Forsythe, S, Sivakjumar, H, Mazzocchi, A, Aleman, J, and Skardal, A. "Model of Patient-Specific Immune Enhanced Tumor Organoids for Immunotherapy Screening." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Clark, C, Aleman, J, and Skardal, A. "Hydrogel Bioink Rheological Parameters for Guiding Development of Inkjet Bioinks." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Bedell, ML, Melchiorri, AJ, Aleman, J, Skardal, A, and Mikos, A. "A High-throughput Approach To Compare The Biocompatibility Of Candidate Bioink Formulations." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Mazzocchi, A, Sivakumar, H, Enck, K, Aleman, J, and Skardal, A. "Tunable Bioink For Support Of Multiple Type 2 Diabetes Specific Tissue Constructs." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Forsythe, S and Skardal, A. "Utilization Of Patient Derived Micro-tumor Constructs For Clinical Testing Of Chemotherapies." TERMIS AM Annual Meeting 2019. Orlando, FL.
- Mazzocchi, A, Yoo, KM, Soker, S, and Skardal, A. "Biomimetic Hyaluronic Acid - Peptide Hydrogel To Model Liver Fibrosis." TERMIS AM Annual Meeting 2019. Orlando, FL.

#### INVITED EXTRAMURAL PRESENTATIONS AND SEMINARS

1. July 22, 2014. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: The Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.
2. July 21, 2015. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: The Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.
3. October 8, 2015. "Models of Cancer and Metastasis", 2016 Biomedical Engineering Society Annual Meeting. Tampa, FL. Tampa, FL.
4. October 16, 2015. "3D Designs and Smart Biomaterials", North Carolina Tissue Engineering and Regenerative Medicine Society Annual Meeting. Winston-Salem, NC.
5. May 3, 2016. "Bioprinting and Biomaterial-based Solutions for Skin Regeneration", American Burn Association, Las Vegas, NV.
6. June 16, 2016. "Bioengineered 3D Tissue and Tumor Models for Drug Screening and Personalized Medicine", World Preclinical Congress – 3D Cellular Models, Boston, MA.
7. July 12, 2016. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: The Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.
8. September 14, 2016. "Metastasis-on-a-Chip", Swiss Laboratory Animal Science Association SGV 2016 Meeting, Basel, Switzerland.
9. October 31, 2016. "Hydrogel bio-ink biomaterials in bioprinting and biofabrication", Biofabrication 2016, Winston-Salem, NC.
10. March 4, 2017. "Biofabrication of Tissue Constructs for Drug Screening, Disease Models, and Personalized Medicine", Regenerative Medicine Workshop, Hilton Head, SC.
11. April 6, 2017. "Biofabricated Tissue and Tumor Organoid Systems for Disease Modeling, Drug and Toxicology Screening, and Personalized Medicine", Providence College, Providence, RI.

12. June 6, 2017. "Hydrogel Biomaterials in Regenerative Medicine and Tissue Engineering Applications", Regenerative Medicine Essentials: From the Fundamentals to the Future, Winston-Salem, NC, Wake Forest University Health Sciences.
13. November 15, 2017. "Biofabrication technologies in regenerative medicine and tissue engineering." Sanford Research Center. Souix Falls, ND
14. June 5, 2018. "Engineering Naturally Derived Hydrogels for Applications in Regenerative Medicine." Wake Forest Institute for Regenerative Medicine, 5<sup>th</sup> Annual Regenerative Medicine Essentials Short Course. Winston-Salem, NC.
15. September 27, 2018. "Bioengineered 3D organoids for disease modeling, drug screening, and personalized medicine." Womble Carlyle/Wake Forest School of Medicine Continuing Professional Development Program. Winston-Salem, NC.
16. November 29, 2018. "Bioengineered Lung Tumor Organoids for Development of Personalized Medicine." 19th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting. NCI/Rockville, MD.
17. June 11, 2019. "Engineering Naturally Derived Hydrogels for Applications in Regenerative Medicine." Wake Forest Institute for Regenerative Medicine, 6<sup>th</sup> Annual Regenerative Medicine Essentials Short Course. Winston-Salem, NC.
18. November 23, 2019. "Predicting Tumor Heterogeneity Evolution After Therapy In Patient-Derived Ex Vivo Glioblastoma Organoids." 19th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting. Cedar Sinai Medical Center. Los Angeles, CA

## DIDACTIC/SYSTEMATIC INSTRUCTION

### Wake Forest Baptist. Medical Center

#### Courses:

BMES 631 – Intro to Regenerative Medicine  
IPP 715 – Techniques in Physiology  
IPP 702 – Systems Physiology and Pharmacology  
MCB 701 – Molecular and Cellular Biosciences  
CABI 723 – Advanced Topics in Cancer Biology

#### Additional educational activities:

WFIRM Summer Scholar Program

- Mentor (2014 - 2018)
- Summer Scholar Seminar Series Organizer (2017-2018)

Regenerative Medicine Essentials Course (weeklong summer course):

- Lecture in Biomaterials Session (2014 - 2018)
- Director for the Decellularization Biomaterials Workshop (2016 - 2017)
- Inventor/Director for the Organoid/Body-on-a-Chip Workshop (2018)

WFIRM Summer High School Student Program

- Mentor (2017-2018) – This year was so successful that we are planning a manuscript around the student's work

2017 NSF-ATE Bioscience Industrial Fellowship Project

- Lecture on Biomaterials in Regenerative Medicine and Biofabrication

## MENTORING RELATIONSHIPS:

The Ohio State University



Graduate Students

2019-present	Kylie Nairon BME PhD Program Advisor
2019-present	Thomas DePalma BME PhD Program Advisor
2019-present	Iris Ribeiro Visiting PhD Scholar Advisor
2020-present	Marco Rodriguez BME PhD Program Advisor
2020-present	Srija Chakraborty BME PhD Program Advisor
2020-present	Hema Sivakumar BME PhD Program Advisor

Wake Forest Baptist Medical CenterGraduate Students

2014-2017	Mahesh Devarasetty Biomedical Engineering Graduate Program Co-Advisor
2014-2019	Matthew Brovold Molecular Medicine and Translational Sciences Graduate Program Ph.D. thesis committee member
2014-2019	Kevin Enck Biomedical Engineering Graduate Program Master's thesis/PhD committee member
2014-2015	Edina Wang Wake Forest Medical School Medical Student Research Program Project Supervisor
2015-2016	Julio Aleman MMTS Masters Program Advisor

2015-2017	Hema Sivakumar MMTS Masters Program Advisor
2016-2020	Andrea Mazzocchi WFBMC BME PhD Program Advisor
2018-present	Steven Forsythe WFBMC Cancer Biology PhD Program Advisor (2016-2018, MMTS Masters Program)
2016-2019	Shiny Rajan WFBMC BME PhD Program Co-advisor
2017-present	Casey Clark WFBMC BME PhD Program Co-Advisor
2017-2019	Jonathon Howarth MCB Masters Program Advisor
2017-2020	Greg Gillespie Biomedical Engineering Graduate Program PhD committee member
2018-2020	Thomas DePalma BME PhD Program Advisor
2018-2020	Kylie Nairon BME PhD Program Advisor
2018-2019	Charlotte Waits Biomedical Engineering Graduate Program PhD committee member
2018-2020	Bryce McCarthy Biomedical Engineering Graduate Program PhD committee member

Postdoctoral Fellows

2017 - 2019	Mahesh Devarasetty, PhD Postdoctoral research fellow Co-advisor
2017 - 2018	Samuel Herberg, PhD

Postdoctoral research fellow

Co-advisor

Current position: Assistant Professor, SUNY Upstate

### Undergraduate Students

2011	Edi Kapetanovic Cornell University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program Current position: Medical Student, Yale Medical School
2012	Mahesh Devarasetty Columbia University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program Current position: Postdoctoral Fellow, Wake Forest Institute for Regenerative Medicine
2012	Callie Turlington Tulane University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program Current position: Graduate Student, Tulane University Biomedical Engineering Master's Program
2013	Christopher Rodman University of California Los Angeles Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program Current position: Research Technician, Wake Forest Institute for Regenerative Medicine
2014	Joseph Denman Appalachian State University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2015	Josh Copus Clemson University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2015	Sarah Grebennikov University of Oklahoma Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2015	Mikyaila Jaramillo University of Notre Dame Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2015	Edcarlos de Souza

	University of Arkansas Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2015-2016	Naren Mehta Wake Forest University Undergraduate Research Program
2016	Katherine McMurray Tufts University Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2016-2017	Connor Huntwork Guilford College Undergraduate Research Program
2016-2018	KyungMin Yoo Wake Forest University Undergraduate Research Program
2018	Erin Maloney University of Buffalo Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program
2018	Samuel Moss University of Wisconsin Wake Forest Institute for Regenerative Medicine, Summer Scholars Research Program