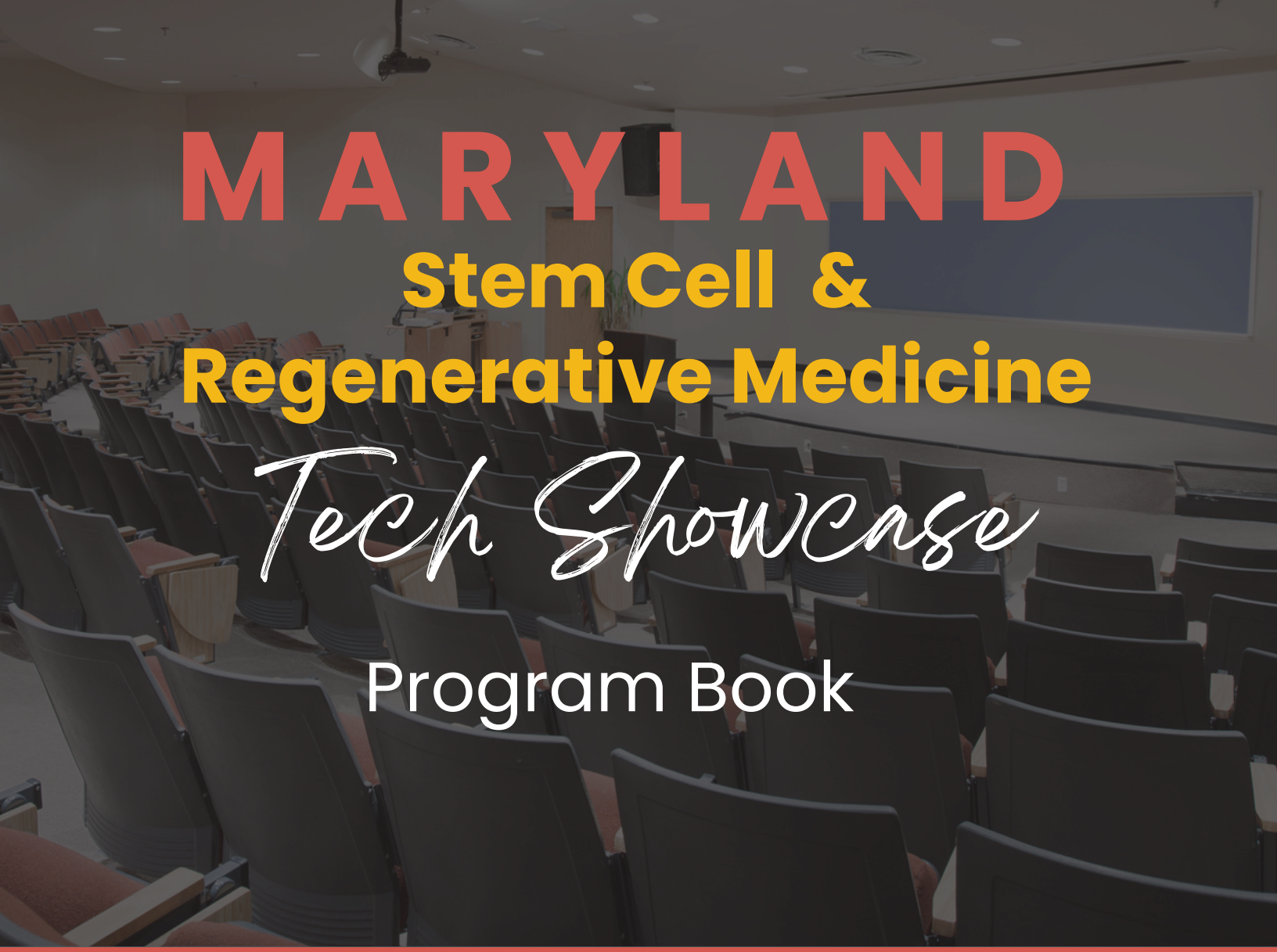

MARYLAND
Stem Cell & Regenerative Medicine
Tech Showcase

Program Book

April 30, 2026

City Garage
101 W Dickman St, Baltimore,
MD 21230, USA

Hosted by:

Maryland DEPARTMENT OF COMMERCE

MSCRF Maryland Stem Cell Research Fund

blackbird LABORATORIES

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9:30 AM	**FEATURED REMARKS** • Matthew Tremblay, PhD, CEO, Blackbird Laboratories
9:50 AM	**ACADEMIC ENTREPRENEURS PANEL** • Annie Kathuria, PhD, JHU • Hee Cheol Cho, PhD, JHU • Miroslaw (Mirek) Janowski, MD, PhD, UMB • Michael Anderson, PhD, JHU • Warren Grayson, PhD, JHU
11:10 AM	**INVITED REMARKS** Artificial Intelligence has Arrived, Quantum is Next • Robin Rowe, Executive Director, Fountain Abode
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Sponsored by BIOQUAL

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Agenda

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4:00 PM	**MID/GROWTH-STAGE COMPANIES PANEL** • Luis Alvarez, PhD, Therapdative, Inc. • Benjamin Holmes, PhD, Nanochon, Inc. • William Rust, PhD, Seraxis, Inc. • Brian Jamieson, PhD, Diagnostic Biochips, Inc. • Greg Merrill, HOH Cells, LLC
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REVIEW PANELISTS

Calvin Aubrey
Broadoak Capital Partners

Neil Davis
TCP Venture Capital

John Dierkes
Pickwick Capital Partners

Sammy Datwani
Life Science Angels

Tien Wong
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Sara Dauber
J.P. Morgan

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ADY Celebration

Chris Steele
MTEC

About Hosts

Maryland Stem Cell Research Fund

Maryland Stem Cell Research Fund (MSCRF) is a state-established program that advances research and commercialization in regenerative medicine. By supporting the full innovation pipeline—from discovery to clinical development—MSCRF helps accelerate therapies that improve and save lives.
To date, MSCRF has invested over $235 million in more than 700 projects, driving both medical breakthroughs and economic growth while strengthening Maryland's leadership in life sciences.

Please visit the MSCRF website: mscrf.org

Maryland Department of Commerce

As the state's primary economic development agency, we stimulate private investment and create jobs by attracting new businesses, encouraging the expansion and retention of existing companies, and providing workforce training and financial assistance to Maryland companies. The Department also promotes the state's many economic advantages and markets local products and services at home and abroad to spur economic development and international investment, trade and tourism.

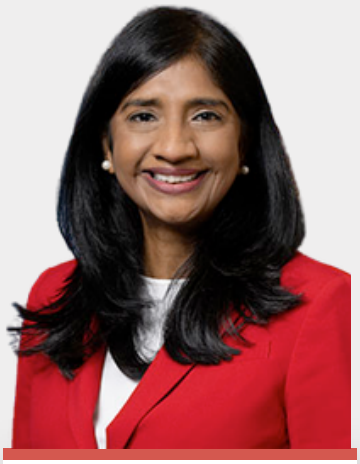
Please visit the Department of Commerce website: commerce.maryland.gov

Blackbird Laboratories

Blackbird Laboratories is a Baltimore-based nonprofit life sciences incubator that helps turn breakthrough academic research into scalable, venture-ready biotech companies. It works with researchers, founders, and partner institutions to bridge the gap between lab discoveries and new therapies for patients with unmet medical needs. Launched in 2023, Blackbird is also helping build Baltimore's biotech ecosystem through company creation, startup support, and shared innovation infrastructure.

Please visit the Blackbird Laboratroies website: blackbirdlab.org/

Keynote Remarks



Aruna K. Miller
Lt. Governor, Maryland

Aruna K. Miller is the 10th Lieutenant Governor of the state of Maryland. She is the second woman to serve as Lieutenant Governor and the first woman of color and immigrant elected to statewide office in Maryland.

Born in Andhra Pradesh, India, Miller and her family immigrated to the United States when she was 7 years old. The daughter of a mechanical engineer, she earned a Bachelor of Science degree in civil engineering from the Missouri University of Science and Technology.

Miller has devoted her life to public service and removing systemic barriers to opportunity. As a civil and transportation engineer in Montgomery County's Department of Transportation, Miller worked to improve the safety of the public and alleviate traffic by creating equitable access to transportation throughout the county. For 25 years, she oversaw programs that advanced access to schools and employment centers, and made community facilities safe for pedestrians, bicyclists, transit users, and people with differing abilities.

From 2010 to 2018, she represented District 15 in the Maryland House of Delegates, where she worked with her constituents to create legislation to invest in STEM education, streamline the regulatory process for small businesses, and was a champion for working families, survivors of domestic abuse, and the environment.

Miller served on the Ways and Means Committee and its Revenue, Transportation, and Education Subcommittees. Additionally, in her second term, she served on the Appropriations Committee, where she served as chair of the Oversight of Personnel Subcommittee, vice chair of the Transportation and Environment Subcommittee, and vice chair of the Capital Budget Subcommittee.

For over 30 years, she has lived in Montgomery County with her husband David, where they raised three daughters. As Lieutenant Governor, her policy profile includes matters relating to transportation, mental health, and STEM equity.

She serves as chair of the Governor's Work Zone Safety Work Group, dedicated to making highway work zones safer and protecting the lives of workers, motorists, and law enforcement.

The Lieutenant Governor also chairs Maryland's first Council on Interfaith Outreach, which convenes faith leaders from across religions and across the state of Maryland to bridge divides, increase religious tolerance, end hate, and better serve all communities.

Speakers

Ruchika Nijhara

Dr. Ruchika Nijhara is the Executive Director of the Maryland Stem Cell Research Fund (MSCRF), where she leads strategy, grant programs, and portfolio oversight to advance regenerative medicine. She works closely with researchers and companies across Maryland to accelerate the translation of stem cell discoveries into life-changing therapies for patients. MSCRF, a nationally recognized, state-supported program, has invested over $200 million in more than 700 regenerative medicine projects, driving innovation and commercialization from discovery to patient care.

With over 20 years of experience in technology commercialization, Dr. Nijhara has held leadership roles across academia and the public sector, including at Georgetown University. She is a 2023 Influential Marylander and Woman of Influence. She holds a PhD in Biochemistry from Delhi University and an MBA from the University of Maryland, and is passionate about accelerating cures for patients in need.

Matthew Cimino

Matthew Cimino works at the intersection of science, business, and economic development. At the Maryland Department of Commerce, he collaborates with companies, universities, and investors to attract investment, support innovation-driven industries, and strengthen Maryland's position as a leader in life sciences, quantum technologies, and advanced manufacturing.

Matthew's background spans scientific research, entrepreneurship, and public service. He has built and scaled businesses, led research initiatives, and now focuses on connecting people, capital, and strategy to create ecosystems where innovation can thrive. His work centers on delivering tangible outcomes, from supporting startup growth to facilitating strategic partnerships and advancing industry-focused initiatives that drive job creation and economic impact. He has a particular interest in how emerging technologies, especially quantum and next-generation life sciences, can move from research into real-world applications. Much of his work involves bringing together diverse stakeholders to accelerate that transition.

Matt Tremblay

Matt Tremblay, PhD, is the Chief Executive Officer of Blackbird Laboratories, a nonprofit technology development platform, and Managing Director of Blackbird BioVentures, an early-stage biotech investment fund. Blackbird Laboratories and Blackbird BioVentures aim to catalyze the creation of new medicines and enabling technologies in Baltimore.

Prior to joining Blackbird, Dr. Tremblay was Chief Operating Officer of Scripps Research and its drug discovery division, Calibr. He earned his PhD in Chemistry at Columbia University. Following postdoctoral work in the laboratory of Peter Schultz, PhD, at Scripps Research, he led a group at the Genomics Institute of the Novartis Research Foundation until helping to launch and run Calibr for 10 years.

Speakers

Matthew Keesan

Matthew Keesan is a technology executive, currently serving as VP & GM of Platform at IonQ (NYSE: IONQ), the world's leading publicly-traded full-stack quantum computing company. His teams build the APIs, tools, integrations, and services that make Ion's quantum computers available 24x7 over the cloud and on-premises.

He holds patents in quantum compilation, hybrid quantum computation, and quantum control automation, as well as large-scale data processing, and has co-authored papers appearing in Nature and Physical Review A. Before IonQ, Mr. Keesan was CTO of Ando, acquired by Uber, and served as fractional CTO and advisor to startups in manufacturing, ecommerce, media, and identity-as-a-service. He also serves on the board of BioHealth Innovation, helping to translate biomedical research to the real world.

Robin Rowe

Robin Rowe is an American AI research scientist, entrepreneur, professor, author, journalist, and Hollywood producer who moved to Baltimore in 2024.

He is CEO of Fountain Abode (Maryland's only independent nonprofit AI research institute), Gap Capital Partners, and Heroic Robots, which is developing AI software for an MRI/TMS medical device. As a DARPA principal investigator, Rowe developed the first DVR and created the first real-time AI NLP for crisis detection, integrated into NATO's GCCS and the President's Daily Briefing system. At SAIC, he founded their AI research lab. His Hollywood software powered digital effects in *Spider-Man: Far from Home*, *Harry Potter*, and *Lord of the Rings*, and animated Mattel's *Barbie Vlogger*.

Review Panelists

Deborah Hemingway, Ecphora Capital

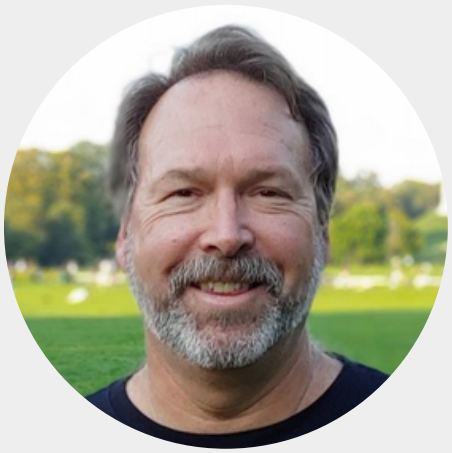
Founder and Managing Partner of Ecphora Capital, Maryland's premiere medtech venture capital firm based in Baltimore, Maryland. Under her leadership, Ecphora Capital has deployed $26 million across 15 portfolio companies in the past three years, establishing itself as a key force in early-stage healthcare innovation.

Deanna Angello, Alpenglow Ventures

Life sciences executive, startup advisor, and investor. Her commercial career spans senior roles at Pfizer, Genentech/Roche, Kite Pharma/Gilead, and Janssen (Johnson & Johnson), with experience launching blockbuster therapies and advising emerging healthcare companies.

Matt Tremblay, Blackbird Labs

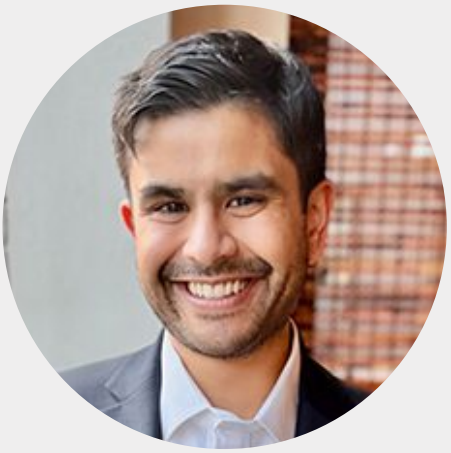
CEO of Blackbird Laboratories and Managing Director of Blackbird BioVentures, working to accelerate new medicines and enabling technologies in Baltimore. Previously COO of Scripps Research and its drug discovery division, Calibr, after earlier leading a group at the Genomics Institute of the Novartis Research Foundation (GNF). PhD in Chemistry, Columbia University.



Bob Storey, LaunchPort

Managing Partner of The LaunchPort, a Baltimore-based medtech accelerator and contract manufacturing center. Longtime Maryland medtech ecosystem leader; separately serves as Managing Director of The MVR Company, focused on new venture creation in medical technologies.

Review Panelists



Prateek Katti, Newpath Partners

Investor at Newpath Partners, an early-stage life sciences venture capital firm, with a background that combines scientific research experience at the NIH and strategic advisory experience at McKinsey.

Cathryn Paine, Anzu Partners

Partner with Anzu Partners, focused on human capital efforts including executive search and organizational analysis in investment diligence. She is currently a Board Observer for EnchargeAI (Fund III) and was previously a Board Director for MultiMechanics (Fund I), which exited to Siemens in 2019. She was named to Venture Capital Journal's 2021 '40 under 40 Rising Stars in VC' list.

Brett Shealy, J.P. Morgan

Executive Director of Life Sciences at J.P. Morgan. He has extensive experience in corporate banking within the life sciences and healthcare sectors, having held various leadership roles at both J.P. Morgan and Wells Fargo. At J.P. Morgan, Brett previously served as Executive Director and Relationship Executive in the Life Sciences & Healthcare division. Before that, he worked in corporate banking for Wells Fargo's Life Sciences division.

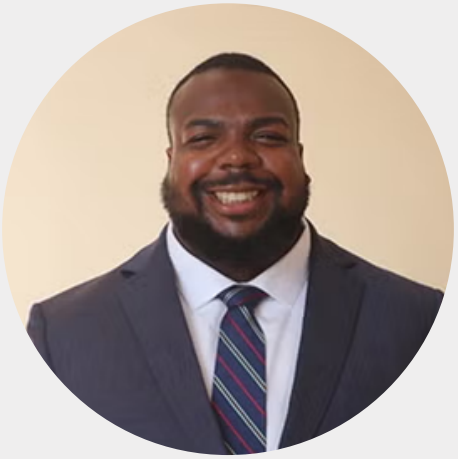
Parsa Amiri, SOSV

Head of Outreach and Investment Analyst at SOSV New York, where he sources and diligences investments and supports cohort companies on business and fundraising strategy. Previously led the Life Sciences track at Endless Frontier Labs at NYU Stern. MS in Biotechnology and Entrepreneurship, NYU; BSc in Biotechnology, University of Tehran.

Review Panelists

Eddie Cherok, Blackbird Labs

Chief Business Officer at Blackbird Laboratories, overseeing business operations, investment strategy, and company formation. Previously a founding team member and Head of Corporate Development at Shoreline Biosciences; earlier roles in corporate development at Calibr/Scripps Research and as a Venture Fellow at Flagship Pioneering. PhD in Molecular Medicine, University of Maryland School of Medicine.



Charles Castelly, Abell Foundation

Financial Analyst at the Abell Foundation, supporting the Foundation's impact investing work. Previously a financial analyst at the U.S. International Development Finance Corporation. U.S. Army veteran; BA, University of Mary Washington.

Mike Ravenscroft, Maryland Momentum Fund

Managing Director of the University System of Maryland Momentum Fund, USM's seed-stage venture fund supporting companies affiliated with USM institutions. Previously with Dreamit Ventures (digital health and medical device), C5 Capital, and CIT GAP Funds (now Virginia Venture Partners); earlier served as a Venture Associate at UMD's Dingman Center for Entrepreneurship.

Rachel Field, Engine Ventures

Principal at Engine Ventures, working with founding teams building breakthrough technologies in energy, health, and infrastructure. Leads the firm's Pathways Workshop Series and Entrepreneurial Fellows Program; board observer for several portfolio companies. Former co-founder of Sensory Cloud. PhD in Biomedical Engineering, Columbia; SB in Mechanical Engineering, Harvard.

Review Panelists

Calvin Aubrey, Broadoak Capital Partners

On BroadOak's growth capital investing team, focused on portfolio management and investment execution. Previously at ARCHIMED (life sciences, pharmaceutical services, and medical devices) and earlier in Healthcare Investment Banking and Leveraged Finance at J.P. Morgan. MS in Biotechnology and BS in Finance and International Business, Georgetown University.

Neil Davis, TCP Venture Capital

General Partner, Propel 3 Fund at TCP Venture Capital. Previously served at TEDCO leading entrepreneurial development programs, including Loaned Executives, Gateway Executives, and Executive Roundtables; earlier VP of Operations at the Emerging Technology Centers (ETC) incubator.

John Dierkes, Pickwick Capital Partners

Managing Director at Pickwick Capital Partners, sourcing funding for early- and late-stage venture firms (especially in healthcare) and capital placement for private equity, real estate, and hedge funds. Previously at Meridian Equity Partners, Deutsche Bank Alex. Brown, Bankers Trust, Kennedy Advisors, and IMAX.

Sammy Datwani, Life Science Angels

Dr. Sammy S. Datwani is an influential C-level executive, entrepreneur, and innovative technology leader with a demonstrated history of developing emergent technologies and commercializing disruptive revolutionary life science tools, analytical instrumentation and medical device products. Sammy is an author and inventor of numerous scientific publications and holder of more than 25 issued patents.

Review Panelists

Tien Wong, Opus8

Chairman & CEO of Opus8, Inc., a private investment and advisory firm investing in exceptional life science and tech enabled services companies, as well as specializing in raising capital for promising tech companies and alternative investment fund managers. He is a graduate of Dartmouth College.

Sara Dauber, JPMorgan

Vice President on the J.P. Morgan Startup Banking team, with 20+ years of experience working with early-stage life science ventures. Previously a Small Business Strategic Consultant at NINDS advising SBIR-recipient companies on pitch coaching, investor materials, financial modeling, and strategic partner outreach; earlier operating roles across pharma, biotech, and medical device startups.

Julie Lenzer, ADY Celebration

Serial entrepreneur and innovation leader whose career spans technology translation across quantum, AI, immersive media, and regenerative medicine manufacturing at ARMI. She previously served as Chief Innovation Officer at the University of Maryland and led the Office of Innovation and Entrepreneurship at the U.S. Department of Commerce's Economic Development Administration.

Chris Steele, MTEC

Chief of Strategy and Business Development at the Medical Technology Enterprise Consortium. 34+ years of combined Army enlisted and Navy commissioned service, with R&D leadership tours at the Office of Naval Research, U.S. Army Medical Research and Development Command, and the Bureau of Navy Medicine and Surgery. Retired Navy Commander; PhD, North Carolina State University.

Academic Entrepreneurs Panel

Annie Kathuria is an Assistant Professor of Biomedical Engineering and Neurosurgery at Johns Hopkins University and the founder of Organotics, Inc. Her lab develops iPSC-derived brain organoid platforms for CNS drug discovery, with a focus on neuropsychiatric diseases including schizophrenia, bipolar disorder, ALS, and Alzheimer's. The core technology, the Multi-Region Brain Organoid (MRBO), recapitulates region-specific neural architecture in vitro and serves as the basis for high-throughput pharmacological screening. She holds a pending patent on the MRBO system and has active commercial contracts with pharmaceutical and federal partners.

Before Johns Hopkins, she trained at King's College London and Harvard Medical School/Broad Institute. She has published over 25 papers with 1,300+ citations, holds a BBRF Young Investigator Award, and has spoken at TEDx Boston. She teaches Cell and Tissue Engineering to 120+ students annually and runs the YouTube channel "Conversations with an Organ Engineer

Annie Kathuria
Assistant Professor, Biomedical Engineering
Johns Hopkins University
annie_kathuria@jhu.edu

Entrain Bio, Inc. is a biotechnology company developing first-in-class regenerative therapies and engineered human cardiac tissue platforms to address disorders of cardiac rhythm. Millions of patients worldwide suffer from sick sinus syndrome, heart block, and other bradyarrhythmias, for which the only approved treatment remains the electronic pacemaker—a device with well-documented limitations including infection risk, lead failure, lifelong reoperations, and particularly poor fit for pediatric patients. Entrain Bio's lead program, BioPace, is a gene therapy that to reprogram a patient's own working myocardium into biological pacemaker cells, restoring rhythm without hardware. The company's second pillar is its proprietary cardiac organoid platforms, the first human cardiac organoids with recapitulates structural and functional hallmarks of human heart rhythm. These platforms enable SAN-specific cardiotoxicity and chronotropic safety screening, disease modeling, and gene therapy testing for pharma partners. With scalability of the technology and regulatory pathway for clear and unmet indications, Entrain Bio is positioned to redefine how cardiac rhythm disorders are treated and studied.

Hee Cheol Cho, PhD, is Associate Professor and Director of Research at the Blalock-Taussig-Thomas Pediatric and Congenital Heart Center at Johns Hopkins University School of Medicine, with joint appointments in Surgery and Pediatrics. His laboratory pioneers biological cardiac pacing, cardiac organoid engineering, and gene therapy, with foundational contributions to gene-based reprogramming for heart rhythm restoration. He is lead PI of multiple NIH and DoD-funded programs. Dr. Cho is also founder of Entrain Bio, Inc., and has two provisional patents filed through Johns Hopkins Technology Ventures covering its cardiac pacemaker organoids platform and matrix engineering technology to regenerate wavering heart rhythm. In March 2026, his team completed a successful FDA INTERACT meeting, which will be pipelined to the company's lead biological pacing program.

Hee Cheol Cho
Co-Director, Blalock-Taussig-Thomas Pediatric and Congenital Heart Center
Johns Hopkins University
hcho21@jh.edu

Academic Entrepreneurs Panel

Ti-com, Inc. (est. 2024) is the U.S. subsidiary of Ti-com LLC, a CRO founded in 2018 with a flagship porcine endovascular stroke model and clients including Medtronic, leading universities, and biotech startups. Ti-com, Inc. now expands into in vitro services—aligning with the industry shift toward non-animal methods—by commercializing a CRISPR-Cas9 genome editing platform for primary mesenchymal stem cells (MSCs). Our direct-to-consumer screening service enables individuals to send banked childbirth tissue-derived stem cells for personalized genome editing feasibility testing—similar to how AncestryDNA or Myriad Genetics democratized genetic information. Where current validation methods cost ~$50,000 via iPSC generation, our platform achieves up to 85% editing efficiency in primary MSCs with >90% cell viability and zero detectable off-target edits, at a fraction of the cost.

As neonatal sequencing becomes standard, the addressable market exceeds $10 billion annually. Initially targeting TSC2 mutations (tuberous sclerosis), we plan to expand to cystic fibrosis, sickle cell disease, and other conditions. Ti-com has the University of Maryland's commitment to license a pending patent on CRISPR-based genome editing in MSCs, and was recently invited to ARPA-H's FRONT Program Proposer's Day. Leveraging Ti-com's CRO infrastructure, we target commercial launch within 24 months.

Miroslaw Janowski, MD, PhD is a Professor in the Department of Diagnostic Radiology and Nuclear Medicine at the University of Maryland School of Medicine and co-founder of Ti-com LLC (2018), a CRO specializing in large animal preclinical services, now expanding into in vitro genome editing through its U.S. subsidiary Ti-com, Inc. (2024). A neurosurgeon by training, he has dedicated his career to stem cell-based regenerative medicine, pioneering MRI- and PET-guided neuroradiology. Dr. Janowski is PI on multiple NIH and Maryland Stem Cell Research Foundation grants and serves on the executive committee of the University System of Maryland faculty.

Miroslaw Janowski
Co-Director of the Program in Image Guided Neurointerventions
University of Maryland, School of Medicine
miroslaw.janowski@som.umaryland.edu

Academic Entrepreneurs Panel

Dr. Michael Anderson is a Postdoctoral Fellow at the Johns Hopkins University School of Medicine and co-founder of Illuvion Bio.

Illuvion Bio is addressing the lack of disease-modifying therapies for Parkinson's disease (PD), driven in part by preclinical models that fail to capture human- relevant pathology. Existing systems are slow and variable, often requiring months to develop phenotypes that poorly translate to patients, contributing to billions in wasted R&D.

Our OASIS platform enables rapid, controllable induction of PD pathology in human iPSC-derived neurons, reducing model development timelines from months to hours. This system allows real -time observation of disease processes and more efficient identification and validation of therapeutic targets.

We operate a dual strategy to balance near-term revenue with long-term value creation. First, we partner with pharmaceutical and biotech companies to provide high-margin screening and validation services using OASIS. Second, we are building an internal drug discovery pipeline by screening the entire human genome to identify and validate targets that prevent or reverse PD.

Illuvion Bio is initially focused on the PD drug discovery market, with expansion into broader neurodegenerative diseases. By improving the speed and predictive power of preclinical models, OASIS aims to reduce drug development risk and establish a new standard for human relevant neurodegenerative research.

Dr. Anderson earned his PhD in Neuroscience from the University of Maryland, Baltimore (UMB), where he participated in the UMB President's Entrepreneurship Fellowship program. He is a current participant in the Spark Accelerator at the Johns Hopkins Pava Center for Entrepreneurship, as well as a Nucleate GVA and NSF I-CORPS finalist. His expertise lies in combining advanced microscopy with stem cell models to investigate the cellular and molecular mechanisms of neurodegeneration. Dr. Anderson is leading the commercialization of the OASIS platform, currently under patent examination (USPTO National Stage), to provide the pharmaceutical industry with high-fidelity, human-relevant models that accelerate the delivery of successful Parkinson's therapeutics

Michael Anderson
Postdoctoral Fellow
Johns Hopkins University
mande120@jh.edu

Academic Entrepreneurs Panel

Traumatic injury or tissue resection often results in craniomaxillofacial bone injuries that are challenging to treat effectively. The highly individualized nature of each injury (including its size, severity, anatomical location, and patient demographics) means a universally "optimized" implant does not exist. Current methods struggle to provide personalized and scalable solutions for regenerating complex three-dimensional bone structures. Craniofacial reconstruction, while offering significant improvements for individuals with severe deformities or injuries, relies on expensive, temporary or non-dynamic technologies that fail to restore full quality of life and presents several notable challenges and issues including long, complicated procedures, the need for multiple revision surgeries to “shape” a non-dynamic solution, prolonged recovery, donor site morbidity, scarring, and psychological/social impacts.

These issues are driving high expectations among clinicians and industry for advancements in craniofacial reconstruction to improve outcomes, reduce complications, and enhance the overall quality of life for patients. Bespoke Bone technology addresses the critical need for affordable, personalized therapies for craniofacial bone regeneration. We overcome limitations in current approaches with advanced, patient-specific 3D-printed bioactive implants. These implants are designed to regenerate bone by leveraging an innovative and machine learning program called DITTO, which will simulate healing and predict the optimal composition of the scaffold.

Warren L. Grayson, PhD is the Founder and CEO of Bespoke Bone. He is also Professor of Biomedical Engineering at Johns Hopkins University and Director of the Translational Therapeutics & Regenerative Engineering Center. An internationally recognized leader in tissue engineering, Dr. Grayson has pioneered biomaterial-based strategies for musculoskeletal and personalized craniofacial bone regeneration. He is an elected fellow of the American Institute for Medical and Biomedical Engineering and was named an Emerging Leader in Health and Medicine by the National Academy of Medicine. His innovation track record includes several issued and pending patents, notably US Patent 9687348 ("Method of Making a Personalized Bone Graft") and US Patent 11925725 ("3D-Printed Extracellular Matrix Mixture and ECM Scaffolds Made with the Same").

Warren Grayson
Director, Translational Tissue Engineering Center
Johns Hopkins University
wgrayson@jhmi.edu

Early-Stage Companies Panel

Caleo Biotechnologies, Inc.

Caleo Biotechnologies is developing a patient-derived preclinical platform designed to address the limitations of conventional models in fibrosis and inflammation. Its proprietary Organ-Dish (OD) technology generates self-organizing, multicellular 3D systems directly from patient samples, integrating epithelial, stromal, and immune compartments to reflect native human tissue structure and function. The platform supports drug screening, mechanistic studies, toxicology, and preclinical validation with improved predictive relevance compared to traditional animal models and reductionist organoid systems. Combined with high-content imaging and AI-based analytics, the OD platform enables scalable and reproducible assessment of disease biology and therapeutic response at the patient level. Initially validated in inflammatory bowel disease (IBD), the platform is expanding into fibrotic lung, liver, and oncology applications. Through biopharma partnerships, Caleo Biotechnologies provides data to support earlier decision-making, reduce translational risk, and improve alignment between preclinical findings and clinical outcomes.

Sam Kamali
CEO and Co-founder
info@caleobiotechnologies.com

Samaneh Kamali is CEO and Co-founder of Caleo Biotechnologies. She holds a PhD in Biomedical Engineering and has over 14 years of experience in disease modeling, focused on the preclinical space. Her work centers on developing patient-relevant systems to study complex inflammatory and fibrotic diseases, with an emphasis on improving translational relevance. She founded Caleo Biotechnologies to address a persistent gap between preclinical models and clinical outcomes, where existing preclinical systems often fail to capture patient biology with sufficient accuracy. Under her leadership, the company is developing decision-grade platforms for precision therapies that generate clinically relevant data, enabling more informed, patient-aligned decisions prior to clinical studies.

Early-Stage Companies Panel

Phycin Inc.

Phycin engineers highly stable growth factors for regenerative medicine and advanced cell culture using an AI + molecular-dynamics design engine and a SynBio green-algae (Chlamydomonas reinhardtii) production platform. Our lead product, Ultrastable™ bFGF, is benchmarked against wild-type and Enantis heat-stable bFGF and retains functional activity after 16 days at 37°C (3T3 proliferation) while supporting greater iPSC expansion. bFGF's instability and cold-chain logistics drive higher dosing, cost, and workflow variability—especially for premixed media and automated culture. Ultrastable™ enables cold-chain-light distribution, ≥10 freeze–thaw robustness, and longer in-use stability, with an animal-free manufacturing route designed for scalable, endotoxin-controlled supply. The direct bFGF opportunity is ~$825M (2025 SOM) across therapeutics, cell culture media, cosmetics, and cultivated meat. Traction includes >$5M non-dilutive funding (MSCRF, DHA, TEDCO, MTEC), collaborations (Johns Hopkins, WRAIR), and patent filings/trade secrets (Algeline® trademark). The lead therapeutic program is hydrogeldelivered Ultrastable™ bFGF for blast-induced tympanic membrane repair (Type B pre-IND scheduled). Phycin is raising $2M to secure 1–2 OEM licenses/RUO revenue, expand IP (PCT; EGF/TGF), and advance the lead therapy program to partner-ready milestones.

Marina Grossi
Research Scientist
marina.grossi@phycin.com

Dr. Marina Grossi is a research scientist with over nine years of experience spanning protein biochemistry, molecular biology, microbiology, and cellular biology. She earned her PhD in Biochemistry from the University of Delaware in 2024, where her work uncovered a novel mitochondrial targeting mechanism used by Legionella pneumophila, the bacterial pathogen responsible for Legionnaires' disease. She then joined Phycin, where she leads efforts to purify and characterize growth factor variants with enhanced thermal stability. Her multidisciplinary expertise has been instrumental in developing Phycin's Ultrastable bFGF™, now advancing toward commercialization. This innovation underscores Phycin's mission to deliver cost-effective, sustainable and robust growth factor solutions for stem cell research and clinical applications.

SereNeuro Therapeutics Inc.

Living pain neurons that absorb joint pain. We inject pain-sensing neurons (SN101) to relieve chronic joint pain. Existing drugs (opioids, corticosteroids) are addictive or cause joints to degrade faster.

Our cells act as a "Pain Sink":

1. Decoy: They absorb inflammatory signals (stopping pain).
2. Repair: They release regenerative factors (halting cartilage loss).

Daniel Saragnese
Co-founder and Chief Executive Officer
dan@sereneuro.com

With over 15 years in biotechnology drug development and manufacturing operations, I have guided multiple therapeutic candidates from preclinical stages through clinical development at venture-backed spin-outs from Stanford and Johns Hopkins University ($40M Series A: Earli, $69M Series B: Ashvattha, NASDAQ: GRAY). My background combines formal training in chemical and biomolecular engineering with healthcare business management expertise, enabling me to effectively bridge technical development requirements with strategic business objectives. Throughout my career, I have built and led teams responsible for Chemistry, Manufacturing, and Controls (CMC), regulatory compliance, and clinical trial execution. I am currently Co-founder & CEO of SereNeuro Therapeutics, developing non-opioid pain therapies.

Early-Stage Companies Panel

miRecule Inc.

Mirecule, Inc. is a biotechnology company focused on advancing next-generation RNA therapeutics for treating rare neuromuscular diseases. The company's proprietary and validated Antibody RNA Conjugate (ARC) platform delivers RNA therapies that target and knock down disease-causing genes in muscle, addressing the underlying genetic causes of these disorders. Mirecule's most advanced candidate, MC-DX4, has been in-licensed by Sanofi and is designed for the treatment of Facioscapulohumeral Muscular Dystrophy (FSHD), the third most common form of muscular dystrophy. Mirecule's second program, MC-DNM2, targets Centronuclear Myopathy (CNM), a rare and devastating pediatric disease with no approved therapies. CNM often presents at birth, with a mortality rate of approximately 50% by age two. By targeting the underlying genetic drivers, Mirecule aims to deliver transformative therapies for patients suffering from these debilitating conditions, for which there are currently no treatments. For more information, please visit: www.mirecule.com.

Anthony Saleh, miRecule
Chief Executive Officer
anthony@mirecule.com

Dr. Anthony Saleh is a biotech entrepreneur and the founder and Chief Executive Officer of miRecule, Inc., a biotechnology company pioneering next-generation RNA therapeutics. Under his leadership, miRecule has developed a proprietary Antibody-RNA Conjugate (ARC) discovery platform, tailored to treat genetic neuromuscular disorders. Dr. Saleh spearheaded the company's strategic collaboration and exclusive licensing agreement with Sanofi to co-develop and commercialize a best-in-class ARC therapy for Facioscapulohumeral Muscular Dystrophy (FSHD)—the second most common form of muscular dystrophy. Prior to miRecule, Dr. Saleh founded multiple biotech startups and held leadership roles at companies including MIMETAS US and Nitron Therapeutics. He also spent a decade as an Investigator at the National Institutes of Health, where he focused on RNA therapeutic development. Dr. Saleh earned his Ph.D. in Biochemistry and Molecular Biology from Johns Hopkins University, and his B.S. in Biochemistry from St. Bonaventure University. He is an author and inventor on more than 50 patents, peer-reviewed publications, and book chapters.

Early-Stage Companies Panel

Stemora Inc.

Srujana Cherukuri
Founder and CEO
scherukuri@stemorabio.com

Stemora, Inc. is a preclinical-stage company developing the first diseasemodifying therapy designed to regenerate native articular cartilage. Headquartered at FITCI in Frederick, Maryland, Stemora is advancing a onestep, intraoperative combination therapy that activates the body's own skeletal stem cells (SSCs) to regenerate articular cartilage - addressing the root cause of osteoarthritis (OA) rather than masking symptoms.

Founded in 2025, the company holds an exclusive license from Stanford University for a breakthrough platform that mechanically and biochemically activates SSCs. By pairing microfracture surgery with a biodegradable scaffold that delivers localized stemcellguiding factors, the therapy creates a regenerative "niche" that supports durable hyaline cartilage formation. This platform has demonstrated robust cartilage regeneration across mouse, human xenograft, and minipig models and is wellpositioned for an expedited regulatory pathway.

Stemora initially targets the $2B focal cartilage defect market, with a clear expansion path into the $10B global OA market. The therapy integrates seamlessly into existing orthopedic workflows, requires no implants or cell transplantation, and offers a scalable, costeffective solution for outpatient settings.

Led by a multidisciplinary team with deep expertise in biomedical leadership, stem cell biology, orthopedic surgery, and regulatory strategy, Stemora is poised to establish a dominant market position while redefining the future of mobility and joint health.

Srujana Cherukuri is the Founder and CEO of Stemora, Inc., where she leads the development of a firstinclass regenerative therapy designed to regrow native articular cartilage for osteoarthritis and focal cartilage defects. She has over 20 years of experience across biomedical research, product development, and executive leadership. She is passionate about building missiondriven teams, fostering scientific collaboration, and accelerating technologies that improve quality of life. Before founding Stemora, Dr. Cherukuri served as CEO of Noble Life Sciences, overseeing strategic operations and organizational growth. She previously held research positions at the Cleveland Clinic Foundation, the National Cancer Institute, and the University of Maryland, focusing on cancer and stem cell biology. Dr. Cherukuri earned her PhD in Biology from Cleveland State University.

Modelus LLC.

Prem Umang
Chief Executive Offier
premumang@modelus.ai

Modelus is the AI-driven QC/QA platform for biomanufacturing and in-vitro models. We turn routine lab data into standardized, objective, regulatory-ready readouts - hardware-agnostic, workflow-native, and deployable without disrupting how labs operate today. The cell therapy, regenerative medicine, and organoid industries are scaling fast, but quality control is still manual, subjective, and inconsistent - creating a bottleneck between promising biology and reliable products. Positioned at the intersection of cell therapy manufacturing, organoid-based testing, and AI-enabled life sciences, Modelus is building the quality layer for the next generation of biological products.

Prem Umang Satyavolu is the Co-Founder and CEO of Modelus, where she leads biology, operations, and go-to-market alongside Co-Founder and CTO Mantej Singh. She has hands-on experience with QC workflows and clinical research in FDA-regulated environments, and oversees partnerships and commercialization at Modelus. She holds an MBA in from Johns Hopkins Carey Business School and is a Johns Hopkins President's Venture Fellow. Modelus has been named one of Poets & Quants' 2025 Most Disruptive MBA Startups and is scaling its platform from within Baltimore's life sciences ecosystem.

Mid/Growth-Stage Companies Panel

Theradaptive, Inc.

Theradaptive is a clinical late-stage firm with programs entering Phase III in regenerative medical indications with a new class of regenerative therapeutic that is positioned to disrupt and capture the musculoskeletal, spinal, and dental graft markets, and become the dominant product in a $4B US market. Our highly de-risked lead product has three FDA breakthrough designations, is being reimbursed by CMS, and is highly sought after at top US hospitals.

Dr. Luis Alvarez is the CEO and Founder of Theradaptive, a late-stage clinical firm focused on developing novel therapeutics for tissue regeneration. As a 20-year Army veteran, the concept for Theradaptive's platform following a combat tour in Iraq, where he observed how soldiers who survived initial blast injuries required amputations due to failed bone healing. This experience led him to pursue a PhD in Biological Engineering at MIT as a Hertz Foundation Fellow, researching regenerative solutions for complex injuries.

Before founding Theradaptive, he served as co-founding Deputy Director of the DoD Regenerative Medicine Program, a DARPA Service Chief Fellow, and Academy Professor at West Point. Dr. Alvarez remains dedicated bringing innovative, life-changing therapies to injured service members and beyond.

Luis Alvarez
CEO and Founder
contactus@theradaptive.com

Nanochon, Inc.

Founded in 2016 and headquartered in Baltimore, MD, Nanochon is developing a breakthrough implant for patients with joint cartilage damage. The company targets a critical gap in orthopedic care: standard joint replacements last roughly 15 years, making them inappropriate for patients under 55 and leaving younger, active adults with very few effective treatment options. Nanochon's flagship product, the Chondrograft™, is a 3D-printed synthetic implant serving a dual purpose — an orthopedic load-bearing device and a tissue growth scaffold. Once implanted via a minimally invasive procedure, it draws blood and active cells from the underlying bone, supporting the body's natural healing and cartilage regeneration. Unlike cadaver grafts or cell-based therapies, Chondrograft™ is fully synthetic, sterile, and shelf-stable, eliminating long wait times and logistical complexity.

The company estimates a $2 billion annual U.S. target market, expanding to $4 billion with ankle, shoulder, and hip applications, and up to $10 billion globally. Nanochon recently launched its first-in-human clinical trial in Canada and plans to raise a Series A to fund a pivotal North American study, targeting an initial U.S. market launch in 2030. CEO and co-founder Ben Holmes has raised nearly $14 in funding to date.

Dr. Benjamin Holmes is the CEO and co-founder of Nanochon, a Washington, D.C.-based medtech company developing a breakthrough cartilage implant. An entrepreneur, inventor, and scientist, Holmes has worked in 3D-printed medical devices since 2011. He earned a B.S. in Mechanical and Aerospace Engineering from the University of Virginia, focusing on material science and biomedical engineering, before completing graduate work at George Washington University, where his research centered on 3D printing and novel materials for orthopedic tissue repair. Holmes holds multiple patents, has published numerous peer-reviewed journal articles, and contributed a chapter to Tissue and Organ Regeneration: Advances in Micro- and Nanotechnology. A veteran of the NSF I-Corps program, he has raised nearly $14 million as CEO, guiding Nanochon successfully to its landmark first-in-human clinical trial.

Ben Holmes
Co-Founder and CEO
info@nanochon.com

Mid/Growth-Stage Companies Panel

Seraxis Inc.

Seraxis Inc is a private biotechnology company headquartered in Germantown, Maryland. Seraxis' mission is to bring transformative cures to the millions of people worldwide struggling with the management and life-threatening complications of insulin-dependent diabetes.

Seraxis' lead program, SR-02, is a novel, off-the-shelf islet replacement therapy slated to enter clinical testing with immunosuppressive therapy in 2026 in patients with severe recurrent hypoglycemia. Once the safety and potency of SR-02 is established, Seraxis is pursuing two technologies to enable withdrawal of immune suppression. Seraxis manufactures its islet replacement therapy in its in-house cGMP cleanroom facility.

Will Rust is the co-founder and CEO of Seraxis Inc. After raising seed funds to launch Seraxis in 2013, he engineered a stem cell line with enhanced pancreatic differentiation potential as a basis for anti-diabetes islet replacement therapy. Seraxis subsequently completed three rounds of VC funding and developed cGMP manufacturing of highly pure and potent replacement pancreatic islets (SR-02). Seraxis received IND clearance for a phase 1/2 clinical study of SR-02 in late 2024. In parallel, Seraxis has developed two proprietary methods of immune evasion to enable implant of its lab-grown islets in non-immune-suppressed patients. Prior to launching Seraxis, Will spent most of his scientific career developing research tools and therapies from embryonic and iPS cells.

William Rust
Chief Executive Officer
wrust@seraxis.com

Diagnostic Biochips Inc.

Diagnostic Biochips (DBC) is a neurotechnology company developing advanced tools to measure functional activity in the brain and in stem cell models (e.g. brain organoids) with unprecedented resolution. Its core platforms enable high-density electrophysiology, capturing real-time neural signaling at the single-unit level across both in vivo and in vitro systems. DBC's established in vivo probe technology is widely adopted in leading research institutions, supporting hundreds of labs and numerous peer-reviewed publications. Building on this foundation, the company has expanded into next-generation in vitro applications with SomaFocus, a novel platform designed to record functional activity in intact 3D human iPSC-derived organoids. This approach addresses a critical gap in drug discovery and disease modeling by enabling direct measurement of neural network behavior, rather than relying solely on structural or molecular endpoints. DBC is positioned at the intersection of neuroscience, drug development, and emerging regulatory support for non-animal models. Its technology enables more predictive preclinical insights, particularly in areas such as neurotoxicity and CNS drug efficacy. With growing traction among academic and pharmaceutical partners, DBC is advancing toward broader commercialization while developing higher-throughput systems to meet industry demand for scalable, functionally relevant screening tools.

Brian G. Jamieson, Ph.D. is Founder and CEO of Diagnostic Biochips, a life sciences tools company building platforms to measure functional neural circuit activity in human systems. The company's technologies span in vivo neural probes and in vitro platforms, including SomaFocus, which enables electrophysiological recording from human brain organoids—providing circuit-level, time-resolved data for CNS drug discovery and neurobiology. Dr. Jamieson holds degrees in physics, electrical engineering, and biomedical engineering from Yale University and University of Michigan. His doctoral work demonstrated the first reliable long-term in vivo recordings using CMOS-integrated neural probes. He previously led MEMS programs at NASA Goddard Space Flight Center and founded Scientific & Biomedical Microsystems, acquired in 2019. A 1996 Olympic silver medalist in rowing, he brings a record of disciplined, high-performance execution to building and scaling technology-driven companies.

Brian Jamieson
Founder and CEO
info@diagnosticbiochips.com

Mid/Growth-Stage Companies Panel

HOHCells

HOHCells is a biotechnology tools company advancing a novel approach to cryopreservation with its lead product, FreezOpt™, a small, patent-protected consumable insert that enables controlled initiation of ice formation inside standard cryovials. Variability in ice nucleation is a well-recognized but under-addressed driver of cell damage during freezing, contributing to inconsistent post-thaw viability across sensitive workflows including stem cells, organoids, and cell therapy materials. FreezOpt integrates directly into existing freezing protocols without requiring new equipment or workflow changes, offering a simple, low-cost solution to improve reproducibility and cell recovery. Early internal testing demonstrates more consistent and earlier ice nucleation compared to standard methods, supporting improved process control. The product is launched for research use only (RUO) and is commercially available via direct e-commerce, with early traction from academic and biotech labs. HOHCells is scaling manufacturing in Maryland and expanding validation across additional cell types and applications. Positioned at the intersection of cryobiology and cell therapy infrastructure, HOHCells aims to establish FreezOpt as a standard consumable in cell freezing workflows, with long-term potential to expand into clinical and biomanufacturing settings.

Greg Merril
Chief Exeecutive Officer
gmerril@hohcells.com

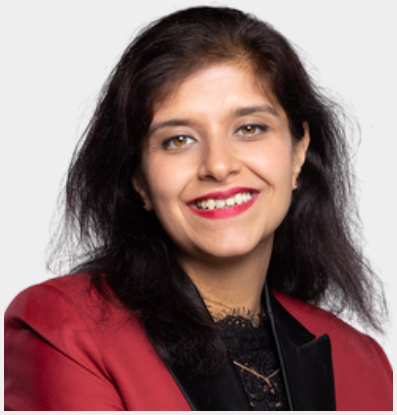
Greg Merril, CEO of HOHCells, is an experienced life sciences entrepreneur with a track record of building and scaling innovative companies across biotech, medical devices, and digital health. As a founding CEO, he has raised over $230 million in equity and non-dilutive funding and led multiple companies from early-stage development through clinical and commercial milestones. His work spans antimicrobial therapies, diagnostics, and enabling research tools. Greg holds 20+ issued patents and is recognized for translating scientific innovation into practical, scalable products that advance research and improve patient outcomes.

Debate

Animal Models vs. Organoids in Drug Discovery

As the landscape of preclinical testing evolves, a central tension is emerging—should drug discovery continue to rely on traditional animal models, or is it time to embrace organoid platforms as the new standard?

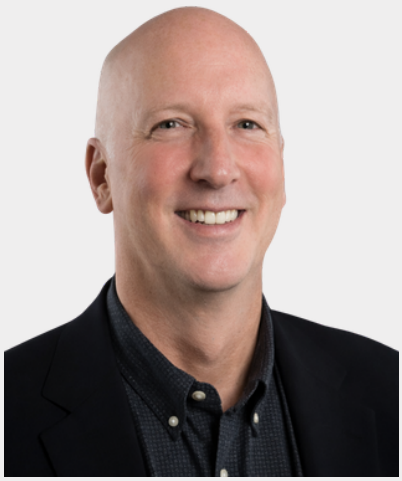
This Oxford-style debate will unpack the trade-offs between biological complexity, translational relevance, scalability, and ethical considerations.



Annie Kathuria
Johns Hopkins

Annie Kathuria is an Assistant Professor of Biomedical Engineering and Neurosurgery at Johns Hopkins University and the founder of Organotics, Inc. Her lab develops iPSC-derived brain organoid platforms for CNS drug discovery, with a focus on neuropsychiatric diseases including schizophrenia, bipolar disorder, ALS, and Alzheimer's. The core technology, the Multi-Region Brain Organoid (MRBO), recapitulates region-specific neural architecture in vitro and serves as the basis for high-throughput pharmacological screening. She holds a pending patent on the MRBO system and has active commercial contracts with pharmaceutical and federal partners.

Before Johns Hopkins, she trained at King's College London and Harvard Medical School/Broad Institute. She has published over 25 papers with 1,300+ citations, holds a BBRF Young Investigator Award, and has spoken at TEDx Boston. She teaches Cell and Tissue Engineering to 120+ students annually and runs the YouTube channel "Conversations with an Organ Engineer.



Stephen Horrigan
Noble Life Sciences

Stephen Horrigan is currently the Chief Scientific Officer and co-founder of Noble Life Sciences. Noble is an AAALAC accredited preclinical CRO that specializes in oncology, cell and gene therapy, infectious disease and medical device studies in both the non GLP and GLP settings. Steve obtained his Ph.D. from Syracuse University and trained at University of Chicago and University of Illinois where the was involved in the early human genome project and studies on the molecular genetics and genomics of cancer and inherited diseases. Steve then joined the faculty at Lombardi Cancer Center at Georgetown University where he focused on molecular diagnostics and genomics in pediatric cancers.

He continued his career in the private sector at Avalon Pharmaceuticals where he was VP of Research and helped develop a biomarker-based drug discovery program and established collaborations with multiple pharmaceutical partners. After leaving Avalon Pharmaceuticals he co-founded Noble Life Sciences and subsequently several other start-up biotech companies including Iterion therapeutics, a clinical stage anticancer therapeutic company. In addition, Steve works as a consultant to consultant for several other biotech companies, including several in Maryland.

Company Posters Summaries

Diagnostic Biochips

Poster Title: 3D Recordings from the Interior of Brain Organoids: Circuit Characterization for High-throughput Drug Discovery

Project Abstract: IPSC (induced pluripotent stem cell) derived brain organoids are a powerful biological substrate for the development of models of neurological and neuropsychiatric disease, These human-cell-based neuronal circuit structures recapitulate key aspects of normal and diseased circuit function, including balanced and unbalanced excitatory and inhibitory activity, synchronized population activity, and spike-to-field phase coupling. Previously, the field has lacked a sufficiently detailed and scalable readout of brain organoid activity, which previously required slicing and long periods of co-culturing. Here we present work showing high density extracellular recordings that can be obtained immediately from brain organoids in a repeatable and high-throughput manner, without requiring extensive expertise in electrophysiology.

Presenter: Grace McCord

Phycin

Poster Title: UltraStable bFGFTM: The Most Stable Growth Factor for Regenerative Medicine, Cell Culture and Beyond

Project Abstract: Basic fibroblast growth factor (bFGF) is widely used in regenerative medicine and advanced cell culture, yet current solutions lack the stability, scalability, and affordability required for demanding applications. These limitations are especially critical in stem cell maintenance, organoid culture, and tissue engineering, where consistent, long-lasting bioactivity is essential.

Ultrastable bFGF™ from Phycin addresses these gaps by delivering sustained, reliable performance under demanding culture conditions, enabling more efficient and reproducible workflows. Its superior thermostability and protease resistance offer:

- Extended stability, reducing media replacement frequency and lowering costs.
- Increased protease resistance, ensuring sustained bioactivity in culture environments.
- Improved reproducibility, critical for complex applications such as stem-cell and organoid-based research.

This innovation is powered by two enabling platforms: an AI-driven molecular dynamics pipeline for designing high-performance growth factor variants, and a SynBio-based algae production system for animal-free, scalable manufacturing—together delivering superior performance and cost efficiency.

Presenter: Satarupa Bhaduri

Company Posters Summaries

SereNeuro Therapeutics

Poster Title (1): From iPSCs to Pain Relief: Preclinical Development of iPSC-derived Nociceptor for the Cell Therapy of Knee Osteoarthritis

Project Abstract: Osteoarthritis (OA) is a leading cause of chronic pain with limited non-opioid treatment options. We developed SN101, an off-the-shelf iPSC-derived nociceptor cell therapy designed to modulate pain and joint homeostasis. Using optimized differentiation and purification, SN101 yields homogeneous sensory neurons expressing TRPV1, SCN9A, and MRGPRX1, with transcriptomic profiles closely matching human dorsal root ganglia neurons. Functionally, SN101 responds robustly to noxious stimuli, including OA synovial fluid. In murine ACLT knee OA models, SN101 reduces pain behaviors and mechanical hypersensitivity by sequestering inflammatory mediators and attenuating nociceptive signaling, accompanied by decreased expression of injury and pain markers in dorsal root ganglia. These results support SN101 as a novel, non-opioid cell therapy and a scalable platform for targeted modulation of chronic pain.

Poster Title (2): Unraveling Sensory Neuron Functionality to Develop SN102 Targeted Gene Therapy for Trigeminal Neuralgia

Project Abstract: Trigeminal neuralgia (TN) is a severe neuropathic pain disorder with limited tolerable treatment options. To address translational gaps in pain therapeutics, we generated purifiable human nociceptor subtypes ($TRPV1^+$, $SCN9A^+$, $MRGPRX1^+$) from hPSCs that recapitulate molecular and functional features of dorsal root ganglia neurons. Leveraging subtype-specific ion channel and receptor profiles, we developed SN102, a KCNQ2-targeted gene therapy using base editing to introduce a naturally occurring pain-dampening allele selectively in peripheral nociceptors. This edit reduced neuronal excitability in vitro. In vivo, SN102 produced robust and durable analgesia, significantly reversing mechanical allodynia and thermal hypersensitivity in the spared nerve injury model. In a mouse osteoarthritis model, SN102 also reduced inflammatory pain and improved behavioral outcomes. These results establish SN102 as a humanized, precision gene therapy platform for sustained peripheral pain modulation, supporting its potential as a non-opioid treatment for neuropathic pain conditions such as TN.

Company Posters Summaries

miRecule

Poster Title: Discovery of an Antibody siRNA Conjugate for the Treatment of CNM

Project Abstract: Centronuclear Myopathy (CNM) is a rare genetic disorder characterized by severe muscle weakness. X-linked myotubular myopathy (XL-MTM), the most common CNM subtype, is associated with half of affected patients dying before 18 months. There are currently no approved disease-modifying therapies for XL-MTM or CNM. Prior studies have shown that reducing Dynamin-2 (DNM2) expression can significantly improve disease phenotypes in MTM1 knockout mouse models and other CNM subtypes. miRecule is developing an antibody RNA conjugate (ARC) platform designed to deliver siRNA targeting DNM2 specifically to muscle tissue. Early data indicate that this approach improves functional outcomes, including increased wire hang time and enhanced weight gain in MTM1 knockout mice. These findings support the potential of miRecule's ARC platform to address underlying disease mechanisms and offer a first-in-class therapeutic approach for XL-MTM and related CNM disorders.

Caleo Biotechnolgies

Poster Title: Bridging the Gap between Preclinical Validation and Fibrosis Therapies with Organ-Dish Technology

Project Abstract: Caleo Biotechnologies' Organ-Dish platform addresses the translational gap between conventional preclinical models and clinical outcomes in fibrotic and inflammatory diseases. The system generates patient-derived, multicellular 3D tissues that self-assemble epithelial, stromal, and immune compartments, preserving native architecture and donor-specific disease signatures. Using intestinal models as proof-of-concept, Organ-Dish constructs recapitulate key histological features, cellular composition, and functional responses observed in matched patient tissues. High-resolution imaging and transcriptomic analyses confirm physiologic relevance, while scalable microplate workflows enable reproducible, high-throughput drug testing. Importantly, the platform captures inter-patient variability, supporting stratified response profiling, and precision therapeutic evaluation. Compared to standard 2D cultures, animal models, and organoids, Organ-Dish offers improved translatability by integrating human-specific biology and immune–stromal interactions. This approach supports earlier, more informed go/no-go decisions, reduces late-stage failure risk, and aligns with emerging regulatory interest in human-relevant New Approach Methodologies (NAMs) for preclinical development.

Academic Posters Summaries

Dr. Yan Li's Lab (Univeristy of Maryland)

Project Title: Spatial Regulation of Cellular and Junctional Mechanics by Substrate Stiffness and Microenvironmental Cues in iPSC-Derived Brain Microvascular Endothelial Cells

Project Abstract: The blood–brain barrier (BBB) is a mechanically responsive interface. Its function is shaped by changes in brain tissue stiffness during development, aging, and disease. Yet how brain endothelial cells sense mechanical cues and integrate them with signals from astrocytes and pericytes remains poorly understood. Here, we investigated subcellular mechanics in human iPSC-derived brain microvascular endothelial cells (iBMECs) cultured on substrates spanning physiological to pathological stiffness. Using atomic force microscopy, we measured Young's modulus at tricellular junctions, bicellular junctions, and cell bodies. On compliant substrates (1, 2.5, and 15 kPa), iBMECs showed pronounced mechanical polarization, with reinforced tricellular regions. This spatial organization was lost on supraphysiological stiffness (194 kPa). Astrocyte and pericyte co-culture reduced global stiffness while preserving tricellular reinforcement on soft substrates, whereas metastatic breast cancer cells disrupted junctional polarization. These findings show how physical and cellular cues jointly regulate BBB mechanics, structure, and dysfunction in disease and metastasis.

Dr. Qun Li's Lab (Johns Hopkins University)

Project Title: Effects of Early General Anesthetic Exposure on Neural Development: An In Vitro Study Using Human Induced Pluripotent Stem Cell (iPSC) Derived Brain Microphysiological System (bMPS)

Project Abstract: Early life exposure to general anesthetics may impair brain development. This phenomenon in humans remains unclear. In this study, we use iPSC-derived brain microphysiological system (bMPS) to investigate the effects of early sevoflurane (SEV) exposure on human brain development. Human iPSCs were cultured and differentiated into bMPS. At week-8, bMPSs were exposed to 2.4% SEV for 4h. 4-weeks after exposure, immunofluorescence and Western blotting were conducted to evaluate the alteration of nerve cells in bMPS. After SEV exposure, number of apoptotic cells increases, and proliferating cells decreases. Ratios of mature neurons over neuro-progenitors and mature oligodendrocytes over oligo-progenitors are reduced, which leads to myelin reduction. SEV also impedes astrogenesis and synaptogenesis. Meanwhile, SEV increases molecules of mTOR pathway and mTOR inhibition reverses the effect of SEV. In conclusion, early SEV exposure substantially disrupts the development of human brain tissue, and the mTOR signal pathway may be involved in this alteration.

Dr. Sui Seng Tee's Lab (University of Maryland)

Project Title: Lipotoxic stress exacerbates PFF-induced α-synuclein pathology via mTORC1-dependent autophagy impairmen

Project Abstract: Metabolic dysfunction and lipid dysregulation are increasingly recognized as contributors to Parkinson's disease, yet how lipotoxic stress influences α-synuclein pathology remains poorly understood. Here, we examined the impact of lipotoxic stress on α-synuclein pathology in human induced pluripotent stem cell (iPSC)-derived neurons exposed to α-synuclein preformed fibrils (PFFs). Palmitate exposure induced lipid droplets and mTORC1 activation, as indicated by increased RPS6 and 4EBP1 phosphorylation. Consistently, lipotoxic stress showed p62 accumulation and altered LC3 processing suggesting disrupted autophagy homeostasis. While PFF alone induced the formation of α-synuclein aggregates, lipotoxic stress enhanced aggregate burden and pathological Ser129 phosphorylation. Importantly, mTORC1 inhibition with Torin1 partially restored autophagy and attenuated palmitate induced α-synuclein pathology.

Together, these findings shows that lipotoxic stress sensitizes neurons to α-synuclein pathology through mTORC1 activation and impaired autophagy providing mechanistic insight into the metabolic regulation of α-synuclein proteostasis and mTORC1-autophagy axis as a potential therapeutic target for synucleinopathies.

Presenter: Junkai Hu

Academic Posters Summaries

Dr. Djordje Atanackovic's Lab (University of Maryland)

Project Title: Tri-specific autologous CD19/CD20/CD22 chimeric antigen receptor (CAR) T-cells for patients with relapsed/refractory B-cell lymphomas

Project Abstract: This first-in-human phase I study evaluates the safety and preliminary efficacy of a novel tri-specific CD19/CD20/CD22 CAR T-cell therapy incorporating ICOS and OX40 costimulatory domains in patients with relapsed/refractory B-cell lymphomas. To date, six patients have been enrolled, and five have been successfully treated. The median age was 63 years, and 50% of patients had diffuse large B-cell lymphoma (DLBCL). No dose-limiting toxicities were observed. Neutropenia and thrombocytopenia were the only grade ≥3 toxicities. One patient developed grade 1 cytokine release syndrome (CRS). No immune effector cell-associated neurotoxicity syndrome (ICANS) or hemophagocytic lymphohistiocytosis (HLH) was observed. An overall response rate (ORR) of 75% was achieved, with one durable response among three responders. CAR-T cells remained detectable up to nine months post-infusion. These findings demonstrate the feasibility of point-of-care manufacturing and support the safety of this novel tri-specific CAR-T cell therapy.

Presenter: Samuel Weeks

Dr. Yuchuan Miao's Lab (Johns Hopkins University)

Project Title: Illuminating human vertebral column development and disease with stem cells

Project Abstract: The metameric organization of our vertebral column is first implemented by the process of somitogenesis, when paired somites are rhythmically generated flanking the neural tube. In human, this process occurs between 3 to 4 weeks after fertilization. Defective somitogenesis leads to a series of congenital disorders characterized by malformation of the axial skeleton. Investigating the etiology is challenging due to limited access to human embryos and ethical concerns. To bypass these difficulties, we used human induced pluripotent stem cells (iPSC) to establish 3D systems in the dish that recapitulate the spatiotemporal features of human somitogenesis, called Somitoid and Segmentoid. We further used CRISPR/Cas9 gene editing to introduce pathogenetic mutations to human iPSCs and combined with our 3D culturing systems to dissect mechanisms of somitogenesis defects. Together, our organoid systems provide a valuable platform to decode principles of somite formation and defects during human early development.

Dr. Miroslaw Janowski's Lab (University of Maryland)

Project Title: Cell Engineering for On-Demand CRISPR-Cas9 Correction of SOD1 Mutations in ALS

Project Abstract: Amyotrophic Lateral Sclerosis (ALS) is a fatal neurodegenerative disease that destroys the motor neurons controlling voluntary muscle, progresses relentlessly, carries a lifetime risk of 1 in 300, and has no cure. Between 9% and 23% of inherited cases are linked to mutations in the SOD1 gene. Genome editing combined with engineered stem cell delivery offers a promising platform for correcting these disease-causing mutations and reducing the disease's substantial morbidity, mortality, and economic burden. As a first step, we used CRISPR-Cas9 and prime editing to knock the G94A SOD1 mutation into HEK293T cells at 43% efficiency. G94A cells showed markedly more severe phenotypes and reduced total SOD1 compared with wild-type, and we confirmed nuclear-to-cytoplasmic mis-localization of TDP-43, recapitulating an ALS hallmark. Next, we will restore normal SOD1 function using high-efficiency CRISPR–Cas9 editing delivered on-demand through engineered stem cells, laying a foundation for mutation-specific cell-based therapies in ALS and related disorders.

Academic Posters Summaries

Dr. Michael Anderson's Lab (University of Maryland)

Project Title: OASIS: A High-Fidelity Human Platform for Disease-Modifying Parkinson's Therapeutics

Project Abstract: Parkinson's Disease (PD) remains a global crisis, with prevalence projected to double by 2050 and U.S. economic burdens hitting $82.2B decades ahead of schedule. Despite this urgency, drug discovery is hindered by slow, variable preclinical models that fail to replicate human pathology, contributing to a 90% clinical failure rate. Illuvion Bio addresses this translational gap with the OASIS platform, utilizing light-inducible protein aggregation in human iPSC-derived neurons. By collapsing model development timelines from months to hours, OASIS enables real-time observation of PD pathology and high-fidelity target validation. Operating a dual-engine strategy, we provide high-margin screening services to biopharma partners while leveraging genome-wide screening integration to build an internal pipeline of first-in-class, disease-modifying therapeutics. We are leveraging a capital-efficient approach to establish a new, human-relevant standard for neurodegenerative research that moves beyond symptomatic treatment to stop disease at the source.

Dr. Curt Civin's Lab (University of Maryland)

Project Title: Size-based processing of hematopoietic stem cells (HSCs) for gene therapies

Project Abstract: HSC gene therapy is FDA-approved for treatment of sickle cell anemia and offers permanent cures for many blood-immune cell disorders. An early step in HSC gene therapy is efficient enrichment of HSC-containing white blood cells (WBCs) from mobilized blood leukaphereses. We previously demonstrated that cell size-based, microfluidic Deterministic Cell Separation (DCS) efficiently enriched WBCs from non-mobilized blood leukaphereses for CAR-T cell manufacturing.

Here, the same DCS System was used to process mobilized blood leukaphereses without clogging. WBCs, CD34+CD45+ HSPCs, hematopoietic colony-forming cells, and long-term in vivo-engrafting HSCs were enriched, with purities and yields comparable to laboratory-standard Ficoll processing. Depletion of red blood cells by DCS was similar; depletion of platelets was much greater; and immunomagnetic CD34+ selection, lentiviral transduction, and nucleofection were similar for DCS-enriched WBCs, compared to Ficoll.

Thus, the DCS system is an effective initial step to process mobilized blood leukaphereses for HSC gene therapies.

Presenter: MJ

Dr. Aaron James's Lab (Johns Hopkins University)

Project Title: Thrombomodulin expression defines perivascular progenitor cell heterogeneity in human blood vessels

Project Abstract: The tunica adventitia of blood vessels contains mesenchymal progenitor cells that are critical for vascular homeostasis and tissue regeneration, yet their heterogeneity remains poorly characterized. Here, we identify CD141 (thrombomodulin, THBD) as a novel marker distinguishing functionally distinct perivascular progenitor subsets. Using integrated single-cell RNA sequencing and spatial transcriptomics of human adipose-derived vessels, our study reveals that CD141 expression defines a hierarchical organization, with CD141High mesenchymal cells exhibiting enhanced stem-like properties, including increased proliferation and colony-forming capacity, while CD141Low mesenchymal cells display greater mesodermal differentiation potential. Spatial transcriptomic mapping demonstrates enrichment of CD141+ cells within arterial adventitia. In vivo, CD141Low cells significantly enhance bone regeneration in a critical-sized calvarial defect model, as assessed by micro-CT and histological analyses. These findings establish CD141 as a key marker of adventitial progenitor cell fate and highlight CD141Low cells as a promising population for skeletal tissue engineering.

Presenter: Neelima Thottappillil

Academic Posters Summaries

Dr. Lena Smirnova's Lab (Johns Hopkins University)

Project Title: APOE3/4 × Heavy Metal Exposure: Synaptic Dysfunction and Alzheimer's Disease Progression

Project Abstract: Alzheimer's disease (AD) is a progressive neurodegenerative disorder influenced by genetic and environmental factors. The APOE4 allele is the strongest genetic risk factor, while metals such as cadmium (Cd), chromium (Cr), and their combined effects on early synaptic pathology remain unclear. This study investigates APOE-dependent response to Cd, Cr, and Cd-Cr mixture using iPSC-derived brain organoids with incorporated microglia-like cells. Organoids were exposed to 320 nM Cd, Cr, or their mixture for one week at 8 and 12 weeks of differentiation. Synaptic and AD-related phenotypes were assessed. Preliminary results show metal-and genotype-specific effects on neurite outgrowth. Metal exposure reduced post-synaptic marker expression at 8 weeks, indicating early synaptic vulnerability. Ongoing work focuses on microglia and neuroinflammatory mechanisms in AD, alongside characterization of electrophysiological changes using high-density microelectrode array (HD-MEA).

Presenter: Yifei Wang

Dr. Yajie Liang's Lab (University of Maryland)

Project Title: Engineering super-power helper cells to assist stem cell therapy through miGECs

Project Abstract: Limited survival and poor integration of transplanted neural progenitor cells (NPCs) remain major barriers to effective NPC transplantation therapy for trauma or diseases in the central nervous system. We developed a multiplexed inducible growth-factor expression and color-tagging system (miGECs). When expressed by helper cells, miGECs enable controllable secretion of multiple growth factors to support target cells, such as NPCs. Meanwhile, it allows multicolor tracking of labeled helper cells at high resolution under fluorescence microscopy, facilitating optimization of growth factor selection, dosing, and application regimens. We show that helper cells expressing miGECs, including bFGF, EGF, IGF, and VEGF, significantly enhance the growth of human iPSC-derived NPCs and mouse neural stem cells (C17.2 cells). This platform may serve as a new strategy for screening growth factors to enhance the efficacy of stem cell therapy, as well as for optimizing helper cell types for specific applications.

Presenter: Honglin Tan

Dr. Moonjung Jung's Lab (Johns Hopkins University)

Project Title: Epigenetic Dysregulation and Inflammaging: The Hidden Cost of Alcohol Drinking in Hematopoiesis

Project Abstract: Chronic alcohol use causes bone marrow (BM) suppression. However, its underlying mechanisms remain unclear. To examine how chronic alcohol use affects hematopoietic stem cells (HSCs), we performed single-cell analyses in human and murine HSCs following alcohol exposure. In xenotransplanted human HSCs, chronic alcohol feeding resulted in a significant myeloid bias, heightened inflammation, double-stranded RNA (dsRNA) sensor upregulation, and reactivation of transposable elements (TEs). In the native murine BM, chronic alcohol exposure primed HSCs to differentiate into myeloid cells and to exhibit heightened inflammation, DNA damage, and epigenetic reactivation of TEs in an age-dependent manner. Alcohol-exposed aged long-term HSCs displayed increased chromatin accessibility at TE-containing loci correlated with aberrant TE transcription. This TE reactivation was associated with the accumulation of dsRNAs in aged BM and activation of innate immune pathways. Our data illuminate potential interactions between alcohol and aging that can reinforce inflammaging and epigenetic dysregulation in HSCs.

Academic Posters Summaries

Dr. Sashank Reddy's Lab (Johns Hopkins University)

Project Title: Programming Adipocytes with RNA: Dual Targeting of Zfp423 and Tle3 to Drive Functional Thermogenesis

Project Abstract: Obesity remains a major unmet clinical challenge, with current therapies primarily targeting appetite and energy balance rather than the underlying cellular mechanisms of adipose tissue expansion. Here, we present an RNA-based strategy to reprogram adipocyte identity by targeting two key transcriptional regulators, Zfp423 and Tle3. We identify these factors as bifunctional adipogenic regulators that maintain white adipocyte phenotype across differentiation states. While inhibition of Tle3 alone induces thermogenic markers such as UCP1, this response is insufficient for functional metabolic activation. In contrast, dual targeting of Zfp423 and Tle3 enables coordinated induction of mitochondrial and metabolic pathways, resulting in enhanced cellular respiration and metabolic flexibility. Using an adipose-directed delivery platform, we demonstrate efficient gene modulation and thermogenic reprogramming in vitro and in vivo. This approach provides a framework for remodeling adipose tissue at its cellular roots and highlights RNA therapeutics as a promising modality for metabolic disease.

Presenter: Nikhil Hajirnis

Dr. Biswa Roopa's Lab (Uniformed Services University of the Health Sciences)

Project Title: Modulation of rescue-competent microRNAs in Cystic Fibrosis Lungs

Project Abstract: Extracellular vesicles (EVs), particularly exosomes, have emerged as novel regulators of cell-cell communication through release of bioactive molecules, including microRNAs (miRNAs, miRs) that are key regulators of gene expression. Cystic Fibrosis (CF) is a life-limiting, pro-inflammatory genetic disorder due to mutations in the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) gene, can modulate a specific set of miRNAs in the lung. To identify novel miRNA-based anti-inflammatory therapeutic targets for CF, we analyzed miR expression in CF cells compared with controls, both in culture and in ex vivo lung biopsies. We demonstrated that delivery of miR-16 can rescue F508del-CFTR function and is therefore a promising candidate for therapeutic intervention. Importantly, our data also indicate that human induced pluripotent stem cell-derived exosomes (hiPSC-exo) express very high levels of miR-16 in their cargo. We found that the hiPSC-exo can effectively deliver miR-16 into lung epithelial cells and induce a significant anti-inflammatory effect. In-vivo imaging revealed that retro-orbital delivery of hiPSC-exo effectively transfer their cargo into lungs at a very high efficiency. In an animal model, C57BL/6 mice were pre-treated with 1011 hiPSC-exo for 9 hours and subsequently induced with Lipopolysaccharide (LPS) for an additional 9 hours. Mice pre-treated with hiPSC-exo showed significant attenuation of LPS-induced lung inflammation, as assessed by Luminex assay of bronchoalveolar lavage (BAL) fluid. Particularly, treatment with hiPSC-exo significantly reduced the expression of pro-inflammatory cytokines (IL-6, IL-17a, IL-1b, IL-1a; $p<0.001$), and chemokines (KC, MCP-1, MCP-1b, Eotaxin, MIP-1a; $p<0.05$). Our study will ultimately lead to the development of novel hiPSC-derived exosome-based therapeutic strategies for CF and related pulmonary disorders.

Presenter: Harshita Tak

Dr. Raphael Meier's Lab (University of Maryland)

Project Title: Enhancing MSC-Derived MMP-9 for Regenerative Therapy in Liver Fibrosis and Type 1 Diabetes

Project Abstract: Mesenchymal stem cells (MSCs) represent a promising platform for regenerative therapies across fibrotic and metabolic diseases. Engineered MSCs with enhanced matrix metalloproteinase-9 (MMP-9) activity were evaluated as a shared regenerative strategy in two disease models. In the first project, MMP-9-enhanced MSCs were generated using two distinct approaches that yielded differential levels of MMP-9 and were tested in liver fibrosis models. These engineered MSCs reduced hepatic stellate cell activation in vitro and significantly decreased collagen deposition in a murine bile duct ligation model, demonstrating anti-fibrotic effects. In second project, the same MMP-9-enhanced MSC platform was applied to a streptozotocin-induced diabetic mouse model using co-transplantation with encapsulated human pancreatic islets. Enhanced MSCs improved islet viability, insulin secretion, and extended graft survival with improved glycemic control. Together, these studies highlight the broad applicability of MMP-9-engineered MSCs in modulating tissue microenvironments, promoting fibrosis resolution, and supporting MSC-based therapies for fibrotic and metabolic disorders.

Presenter: Anjali Verma

Academic Posters Summaries

Dr. Elias Zambidis's Lab (Johns Hopkins University)

Project Title: Derivation of Self-Renewing Neuro-Retinal Stem Cell Lines that Directly Generate Authentic Self-Organizing Whole Human Eye Organs

Project Abstract: Due to scarcity of adult ocular donor tissue and the inability of regenerating diseased neuro-retinal tissues for treating blinding retinopathies, hiPSC-based retinal organoid (RO) methodologies have been exploited for generating transplantable retinal progenitors (RP); (e.g., photoreceptors, retinal ganglion cells, and retinal pigmented epithelium (RPE)). However, poor scalability, hiPSC interline variability of differentiation, and unreliable reproducibility of conventional RO technologies have hampered translational applications. We developed a new class of human stem cells termed Tankyrase/PARP Inhibitor-Regulated Naïve Stem Cells (TIRN-SC) (aka MoroPLUR stem cells). TIRN reprogramming reverts conventional hiPSC to a primitive 'totipotent-like' 4-to-8-cell blastomere-stage transcriptional state. Here, we report for the first time that ROs differentiated from TIRN-SC possessed unexpected abilities to generate lineage-restricted multipotent self-renewing neuro-retinal stem cell (TIRN NR-SC) lines that could generate self-assembling whole human eye structures. Commercialization of TIRN NR-SC products may have high impact for ocular tissue engineering, retinal tissue drug screening, and clinical trials.

Dr. Michal Zalzman's Lab (University of Maryland)

Project Title: MIMIC-3D: Redefining Tissue Models for Precision Medicine

Project Abstract: Most drug trials fail because they are tested in systems that don't resemble human biology. MIMIC-3D develops large, structured tissue and tumor models optimized for drug screening. By replacing oversimplified and non-predictive models, we aim to transform clinical translation, reduce costs, and unlock truly personalized medicine. At its core, MIMIC-3D generates living, multicellular tumor environments in which cancer behaves more like it does in the human body. The platform combines: (i) Key biological advantages such as large tissue size, cell-to-cell interactions, and tumor invasion and migration. (ii) Key operational advantages including scalable production, centralized manufacturing, storage, and high reproducibility.

No existing technology, including organoids, matches this biological fidelity with operational scalability, positioning MIMIC-3D as a transformative solution for preclinical oncology. Our patented technology is supported by strong experimental data, including >90% post-thaw viability, large-scale structured tissue integrity, and functional tumor behaviors such as invasion, migration, and stromal interaction. MIMIC-3D is led by an interdisciplinary team spanning neuroscience, stem cells, oncology, and bioengineering, with a track record of translating academic innovation into applied technologies. The global preclinical oncology market exceeds $20B annually and is rapidly shifting toward more predictive models. MIMIC-3D will target drug developers and CROs through a B2B model. Within 18 months, we aim to establish validated use cases with key partners, with broader market penetration and expanded tissue offerings over the next 2–3 years.

Dr. Maged Harraz's Lab (University of Maryland)

Project Title: BASP1 mediates cocaine induced autophagy in hiPSC derived dopaminergic neurons

Project Abstract: Cocaine use disorder (CUD) is severely debilitating and its overdose is fatal. In recent years, there has been a sharp increase in national cocaine-associated overdose deaths especially in Maryland. Our work suggests that the brain acid-soluble protein 1 (BASP1) is a high-affinity receptor for cocaine in mice. Using human induced pluripotent stem cells (hiPSC)-derived neural cells in preclinical studies to reproduce findings from animal studies increases the probability of successful drug discovery and development. Hence, we have differentiated hiPSCs into dopaminergic (DA) neurons to validate BASP1 as a cocaine effector protein. We demonstrate the expression of BASP1 in hiPSC DA neurons. Cocaine potently induces autophagy in hiPSC DA neural cultures reproducing our previous findings in mouse neurons. We show for the first time that depletion of BASP1 abolishes cocaine-induced autophagy. Our findings suggest that BASP1 might serve as a therapeutic target for cocaine use disorder.

Academic Posters Summaries

Dr. Marjan Gharagozloo's Lab (Johns Hopkins University)

Project Title: Generating CRISPR–Cas9–Engineered iPSC Lines to Characterize NLRX1 Function in Reactive Astrocytes in Multiple Sclerosis

Project Abstract: Multiple sclerosis (MS) is a chronic inflammatory and neurodegenerative CNS disease. Current disease-modifying therapies suppress peripheral immunity but do not limit chronic CNS inflammation or the neurodegenerative processes that drive progressive MS (PMS). Reactive astrocytes lose homeostatic functions and adopt proinflammatory, neurotoxic, and immunometabolic programs that drive PMS pathology. NLRX1, a mitochondria-localized innate immune sensor, maintains mitochondrial homeostasis and negatively regulates inflammatory signaling. Mouse MS studies show NLRX1 is neuroprotective and regulates astrocytes, suggesting it may be a therapeutic target. The lack of human astrocyte models limits translational insight. We generated independent CRISPR/Cas9 NLRX1-/- human induced pluripotent stem cell (hiPSC) lines and confirmed gene disruption and validated complete loss of NLRX1 expression. These lines are differentiated into astrocytes and polarized to neurotoxic states to assess inflammatory, proteomic, and metabolomic effects. The NLRX1-/- iPSC lines and multiomic datasets generated from our study will be resources to study NLRX1-dependent mechanisms in MS and other neurodegenerative diseases.

Presenter: Ashwarya Sharma

Dr. Hee Cheol Cho's Lab (Johns Hopkins Univeristy)

Project Title: Entrain Bio: Restoring the Heart's Own Pacemaker

Project Abstract: Cardiac arrhythmias affect millions across two clinical extremes: bradyarrhythmias requiring electronic pacemakers and tachyarrhythmias requiring lifelong pharmacotherapy or ablation. Both lack disease-modifying options and are poorly suited for pediatrics. Entrain Bio is commercializing two convergent Johns Hopkins technologies that address both ends of the rhythm spectrum. The therapeutic asset is a TBX18 gene therapy that reprograms atrial cardiomyocytes into autonomically responsive pacemaker cells, restoring physiologic rate control in bradycardia without hardware. Large-animal efficacy is established; FDA dialogue is underway, advancing toward IND. The platform asset is the human cardiac pacemaker organoid, a stem cell-derived replica of the heart's natural pacemaker, built from epicardial and pacemaker-like cardiomyocytes. These organoids respond to adrenergic and ion-channel drugs as the human pacemaker does, and drive organized rhythm in adjacent tissue. Applications include safety screening for proarrhythmic and antiarrhythmic drugs, heart-rhythm target discovery, and cell-based pacemaker therapy. Goal: a vertically integrated heart-rhythm treatment pipeline.

Gratitude

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