

NATIONWIDE CHILDREN'S

HYDROCEPHALUS ASSOCIATION & RUDI SCHULTE RESEARCH INSTITUTE RESEARCH WORKSHOP

Honoring the legacy of Dr. Michael Pollay

ENGINEERING IN HYDROCEPHALUS

Monday, August 4, 2025

7:00 AM – 5:00 PM

Tuesday, August 5, 2025

7:00 AM – 3:30 PM

**Nationwide Children's Hospital
Conference Center**

520 Butterfly Gardens Dr
Columbus, OH 43215

*Attendees will stay at the Hilton Downtown Columbus,
402 North High Street, Columbus, OH 43212*



RSRI



Rudi Schulte
Research Institute



HANDS
Hydrocephalus Association
Network for Discovery Science
Collaboration • Innovation • Impact



WELCOME LETTER

From HA President and CEO, Diana Gray

Welcome to the 2025 Engineering in Hydrocephalus Research Workshop, hosted by the Hydrocephalus Association (HA) and Rudi Schulte Research Institute (RSRI) at Nationwide Children's Hospital in Columbus, Ohio.

Planning Committee

Carolyn Harris, PhD (Chair)

Wayne State University

Anne Benninghaus, PhD

RWTH Aachen University

Bonnie Blazer-Yost, PhD

Indiana University Indianapolis

Ramin Eskandari, MD

Medical University of South Carolina

Kyle Gospodarek, MD

Indiana University

Albert Isaacs, MD, PhD

Nationwide Children's Hospital

Pat McAllister, PhD

Virginia Commonwealth University

Ellis Meng, PhD

University of Southern California

Sara Qvarlander, PhD

Umeå University

Stephanie TerMaath, PhD

University of Tennessee Knoxville

This event represents a unique opportunity to bring together leading experts in engineering, medicine, and research to address key challenges in hydrocephalus treatment. Together, we will drive innovations that will improve the care and outcomes for individuals living with hydrocephalus.

This year's workshop features the following key sessions:

- **Shunt occlusion and overdrainage:** Exploring solutions to improve the safety and effectiveness of shunt systems.
- **Modeling:** From computational models to benchtop, in vitro, and animal studies, examining how these tools can inform treatment development.
- **Diagnostics:** Discussing the latest advances in monitoring systems, sensors, and imaging to enhance diagnosis and patient care.
- **Industry panel:** Addressing the challenges of device advancement and fostering collaboration between industry and academic researchers.

We will also have patients and caregivers share their experiences throughout the workshop. Their insights about living with hydrocephalus and their perspectives on current treatments are essential for guiding the development of more effective and patient-centric devices.

We are excited to foster an environment that encourages collaboration. We are confident that the conversations and partnerships formed here will lay the foundation for advancements that could dramatically improve both the treatment and quality of life for individuals living with hydrocephalus.

We would like to express our sincere gratitude to RSRI for their generous support of this event and thank each of you being part of this important workshop.

Sincerely,

Diana Gray, MA

President and Chief Executive Officer

RESEARCH WORKSHOP AGENDA

SUNDAY, AUGUST 3: ARRIVAL

Location: **Hilton Columbus Downtown** (attendee hotel)

-  **Drop-in: Funding, Collaboration, & Meet-and-Greet** | Spark Lounge, Lobby Level of Tower 402 **4:30 PM – 6:00 PM**
Meet the Hydrocephalus Association Leadership:
Monica Chau, PhD, Amanda Garzon, MA, Diana Gray, MA, Samantha Lanjewar, PhD, Michael Siegel, PhD, and Yun Yung, PhD
-  **Trainee Social Hour** | Spark Lounge, Lobby Level of Tower 402 **6:00 PM – 7:30 PM**
All trainees are welcome to join for appetizers, networking, and socializing

MONDAY, AUGUST 4: DAY 1

Location: **Conference Room 2.6**, Nationwide Children's Hospital Conference Center

-  **Breakfast and Registration | 7:00 AM**
-  **Welcome and Introduction** **8:00 AM**
Speakers: Diana Gray, MA and Monica Chau, PhD, Hydrocephalus Association

SESSION 1: BRIDGING THE GAPS IN HYDROCEPHALUS AND ENGINEERING

-  **Keynote: *Bridging the Gaps in Hydrocephalus and Engineering*** **8:20 AM**
Speakers: Carolyn Harris, PhD, Wayne State University and **Ramin Eskandari, MD**, Medical University of South Carolina
-  **Caregiver Perspective: *"Don't Not Try!": Kate's Life and Legacy with Hydrocephalus*** **8:40 AM**
Speaker: Pam Finlayson, Team Hydro

SESSION 2: OCCLUSION

Moderator: Carolyn Harris, PhD, Wayne State University

-  **Clinical Perspective: *Neurosurgical Challenges in Hydrocephalus: The Shunt Revision*** **8:50 AM**
Speaker: Francesco Mangano, DO, FACS, Cincinnati Children's Hospital Medical Center
-  **Patient Perspective: *Effect of Shunt Revisions on Quality of Life*** **9:15 AM**
Speaker: Kyle Gospodarek, MD, Indiana University School of Medicine
-  **Unblocking Unknowns: *A Deep Dive into Shunt Obstruction*** **9:25 AM**
Speaker: Carolyn Harris, PhD, Wayne State University
-  **Break | 9:50 AM**
-  **New Thinking on Biocompatibility to Advance Hydrocephalus Shunts** **10:10 AM**
Speaker: Buddy Ratner, PhD, University of Washington
-  **Treatment for Adult Hydrocephalus (iNPH): *Techniques and Practices to Minimize Infection Risks*** **10:35 AM**
Speaker: Mark Hamilton, MDCM, University of Calgary

SESSION 3: OVERDRAINAGE

Moderator: Bonnie Blazer-Yost, PhD, Indiana University Indianapolis

- ✔ **Patient Perspective: *Experience with Overdraining and Headaches*** **11:00 AM**
Speaker: Jennifer Bechard, Hydrocephalus Association
- ✔ **Clinical Perspective: *Overdrainage and the Potential Role of Smart Shunt Design*** **11:10 AM**
Speaker: Bermans Iskandar, MD, University of Wisconsin-Madison
- ✔ ***Shunt Dynamics: Benchtop and Computation Fluid Dynamics (CFD) Insights*** **11:35 AM**
Speakers: Ahmad Faryami, PhD and **Christopher Roberts, MS**, Wayne State University

 **Lunch | 11:45 AM - 1:00 PM**

 **Overdrainage Model Demonstration**
Demo: Ahmad Faryami, PhD, Wayne State University

 **Trainee Poster Session**

SESSION 4: MODELING

Moderator: Pat McAllister, PhD, Virginia Commonwealth University

- ✔ ***The Convergence of High Performance Computing and Artificial Intelligence to Address Patient Specific Treatment*** **1:05 PM**
Speaker: Stephanie TerMaath, PhD, University of Tennessee Knoxville
- ✔ ***Bedside to Benchtop: Pros and Cons*** (virtual presentation) **1:35 PM**
Speakers: Anne Benninghaus, PhD, RWTH Aachen University and **Sara Qvarlander, PhD**, Umeå University
- ✔ ***In Vitro Modeling of Blood-Cerebrospinal Fluid Barriers*** **2:00 PM**
Speaker: Bonnie-Blazer Yost, PhD, Indiana University Indianapolis
- ✔ ***Animal Models of Hydrocephalus: An Engineering Perspective*** **2:25 PM**
Speaker: Pat McAllister, PhD, Virginia Commonwealth University

 **Break | 2:50 PM**

SESSION 5: PATIENT AND CAREGIVER PANEL

Moderator: Samantha Lanjewar, PhD, Hydrocephalus Association

- ✔ **Panel Topic: Real-Life Experiences to Inform Device Development** **3:10 PM**
 - Living day-to-day with a shunt: challenges and adaptations
 - How exercise, posture, and daily activities impact device function
 - What patients and caregivers want device developers to understand

Panelists: **Pam Finlayson**, Team Hydro; **Kyle Gospodarek, MD**, Indiana University; **Jennifer Bechard**, Hydrocephalus Association; **Stephanie TerMaath, PhD**, University of Tennessee Knoxville; **Jim Devine, BBA**, Retired

SESSION 6: ADVANCE THE FIELD (BREAKOUT SESSION)

- ✔ **Small Group Breakouts** (groups of 7-8) **3:40 PM**
How do we advance the field?
- ✔ **Collaborative Reflections - Group Highlights** **4:25 PM**
- ✔ **End of Day 1** **5:00 PM**

 **Welcome Dinner | Location: Goodale Station (77 E Nationwide Blvd) | 6:00 - 8:30 PM**

RESEARCH WORKSHOP AGENDA | DAY 2

TUESDAY, AUGUST 5: DAY 2

Location: **Allen Auditorium**, Nationwide Children's Hospital Conference Center

 **Breakfast and Registration | 7:00 AM**

 **Opening Remarks** **8:00 AM**

SESSION 7: DIAGNOSTICS - MONITORING AND SENSORS

Moderator: Ellis Meng, PhD, University of Southern California

 **Patient Perspective: *Normal Pressure Hydrocephalus (NPH) Diagnosis Difficulties*** **8:05 AM**
Speaker: Jim Devine, BBA, Retired

 **Clinical Perspective: *Monitoring the Brain: What Sensors Make Sense?*** **8:15 AM**
Speaker: Mark Luciano, MD, PhD, Johns Hopkins University

 **Shunt Flow and Pressure Monitoring Overview** **8:40 AM**
Speaker: R. Chad Webb, PhD, Rhaeos

 **Challenges and Future Outlook for Sensing Technology** **9:05 AM**
Speaker: Ellis Meng, PhD, University of Southern California

 **Diagnosing Cerebrospinal Fluid Circulation Impairment Using In-Vivo Shunt Evaluation** **9:30 AM**
Speaker: Peter Smielewski, PhD, University of Cambridge

 **Smart Shunts for Hydrocephalus: Progress, Pitfalls, and the Path Forward** **9:55 AM**
Speaker: Fabian Flürenbrock, PhD, ETH Zurich

 **Break | 10:20 AM**

SESSION 8: IMAGING DIAGNOSTICS

Moderator: Ramin Eskandari, MD, Medical University of South Carolina

 **Caregiver Perspective: *Burden of Overimaging*** **10:40 AM**
Speaker: Amanda Garzon, MA, Hydrocephalus Association

 **Clinical Perspective: *Hydrocephalus Radiology 101 with Diffusion Tensor Imaging (DTI) Applications*** **10:50 AM**
Speaker: Joshua Shimony, MD, PhD, Washington University in St. Louis

 **MRI Insights to Improve Hydrocephalus Hardware** **11:15 AM**
Speaker: Matt Borzage, PhD, Children's Hospital Los Angeles

 **Group Discussion: Think-Pair-Share** **11:40 AM**

 **Lunch | 12:20 PM - 1:00 PM**

SESSION 9: INDUSTRY PERSPECTIVES

Moderator: Scott Olson, MBA, Wayne State University

A. Alternative Treatments

- ✓ **Moving Hydrocephalus Treatment from the OR to the Angio Suite** 1:05 PM
Speaker: DJ Cass, MBA, CereVasc

B. Emerge Industry Panel: Diagnose, Prevent, and Treat Hydrocephalus

- ✓ **Panel Introduction** 1:30 PM
Speaker: Scott Olson, MBA, Wayne State University

- ✓ **Session Topic: Barriers and Collaborations to Advance Research** 1:35 PM
Panelists:

- **Diagnostics:**
 - Sascha Lee, PhD, MBA, Senseer Health
 - Simon Malpas, PhD, Kitea Health
 - Chad Webb, PhD, Rhaeos
- **Prevention:**
 - Angela Hale, MS, Anuncia Medical
 - Todd McFarland, MA, Cerulean Scientific
 - Kenneth Wynne, PhD, WynnVision
- **Treatment:**
 - DJ Cass, MBA, CereVasc

☕ Break | 2:35 PM

SESSION 10: FUNDING OPPORTUNITIES

Moderator: Raudel Avila, PhD, Rice University

- ✓ **Midwest Pediatric Device Consortium** 2:50 PM
Speaker: Cory Criss, MD, Nationwide Children's Hospital

- ✓ **Department of Defense: Congressionally Directed Medical Research Programs** 3:10 PM
(virtual presentation)
Speaker: Kathryn Argue, PhD, Peer Reviewed Medical Research Program

- ✓ **Closing and End of Workshop** 3:30 PM



For more information visit:
hands.hydroassoc.org/research-workshop



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6903 Rockledge Drive, Suite 740

North Bethesda, MD 20817

(888) 598-3789 | www.hydroassoc.org | info@hydroassoc.org

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