



LOMA LINDA UNIVERSITY

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School of Medicine

THE LAWRENCE D. LONGO, MD  
CENTER FOR PERINATAL BIOLOGY  
7<sup>TH</sup> ANNUAL LONGO SYMPOSIUM

February 11, 2025  
9:00 am – 4:30 pm

# Welcome



## Lubo Zhang, PhD, Director

It is my great pleasure to welcome you to the 7<sup>th</sup> Annual Longo Symposium. We are very grateful to the speakers and the organizing committee for their contributions to this exciting and first-rate program.

The Lawrence D. Longo, MD Center for Perinatal Biology was established by Drs. Lawrence D. Longo, Gordon G. Power and Raymond G. Gilbert in 1973. Over the past five decades, the Center has become a world-renowned research center in maternal health and developmental biology. Today, our Center consists of fifteen biomedical scientist faculty and two associate faculty from clinical departments, devoted to the investigation of maternal health, fetal and newborn well-being, and developmental programming of health and disease. In addition, the Center is dedicated to training of basic and physician scientists. The major funding of research in the Center is from the National Institutes of Health, as well as other agencies. The faculty of the Center are national and international leaders in perinatal biology, physiology, endocrinology, neurobiology, and pharmacology, and are experts in their individual disciplines.

This annual symposium honors Dr. Longo's legacy in our Center and Loma Linda University. The goal of the symposium is to share exciting basic science and translational research from maternal, fetal and neonatal health, as well as to understand mechanisms underlying developmental programming of health and disease. This year's symposium offers multiple recent high-impact findings from several of the most prestigious international laboratories studying maternal and fetal physiology. The keynote speaker, Professor Dino Giussani from Cambridge University, is a pioneer in studies of fetal cardiovascular development and adaptation to hypoxia. His work and multiple previous visits to our Center have inspired numerous new ideas and studies amongst our faculty.

Another goal of this symposium is to identify a recipient of the Longo/Power New Investigator Award, which acknowledges the tireless efforts of Drs. Longo and Power to inspire the scientific careers of numerous young investigators, many of whom are leaders in their fields today. Congratulations to this year's recipient, Dr. Mancy Tong from Yale School of Medicine.

We are grateful to our guest speakers for edifying us on various aspects of their research, and we hope that this symposium will create an opportunity and inspire attendees in pursuit of basic and translational research.

Thank you for joining us.

# Symposium Program

- 9:00 – 9:05 am Introduction  
Lubo Zhang, PhD, Director, Lawrence D. Longo, MD Center for Perinatal Biology, Loma Linda University
- 9:05 – 9:15 am Welcome and Opening Remarks  
Paul Herrmann, MD, PhD, Vice Dean, Academic Affairs, School of Medicine, Loma Linda University
- 9:15 – 10:15 am Keynote Address  
*Healing Tiny Hearts Across Generations*  
Dino A. Giussani, PhD, ScD, FRCOG, University of Cambridge
- 10:15 – 10:30 am Break
- 10:30 – 11:15 am *Iron Deficiency Anemia in Pregnancy: A Deceptively Complex Global Health Challenge*  
Stephane L. Bourque, PhD, University of Alberta
- 11:15 – 12:00 pm *A Vascular-Centric Approach to Neurodevelopment*  
Elizabeth E. Crouch, MD, PhD, University of California, San Francisco
- 12:00 – 1:30 pm Lunch
- 1:30 – 2:15 pm *Maternal Immune Activation: Sex Differences in Fetal Brain and Placental Programming*  
Andrea G. Edlow, MD, MSc, Harvard Medical School
- 2:15 – 3:00 pm *Physiologic Extra-Uterine Support of the Extreme Premature Fetus – Potential and Progress Toward Clinical Application*  
Alan W. Flake, MD, Children’s Hospital of Philadelphia
- 3:00 – 3:15 pm Break
- 3:15 – 3:30 pm Introduction: Longo/Power New Investigator Presentation  
Stella Gouloupoulou, PhD, Lawrence D. Longo, MD Center for Perinatal Biology, Loma Linda University
- 3:30 – 4:15 pm *The Maternal Uterine Environment: A Critical Player for Pregnancy Success*  
Mancy Tong, PhD, Yale School of Medicine
- 4:15 – 4:30 pm Closing Remarks  
William J. Pearce, PhD, Associate Director, Lawrence D. Longo, MD Center for Perinatal Biology, Loma Linda University

## Keynote Speaker



### **Dino A. Giussani, PhD, ScD, FRCOG**

Dr. Giussani is Professor of Developmental Cardiovascular Physiology & Medicine at the University of Cambridge. He also holds a Professorial Fellowship at Gonville & Caius College Cambridge, where he is Director of Studies in undergraduate medicine. He graduated with a first-class BSc (Hons) in Physiology (valedictorian) from Royal Holloway University of London, and PhD from University

College London under the mentorship of Professor Mark Hanson. He was a Post-Doctoral Fellow at the Universidad de Chile with Professor Anibal Llanos and at Cornell University with Professor Peter Nathanielsz, before taking up a tenured Lectureship at the University of Cambridge in 1996. He was promoted to Associate Professor in 2004 and Full Professor in 2011. In 2016, he received the ScD degree from the University of Cambridge.

Professor Giussani has secured over £18M in grant funding, published > 240 full papers and his research has won 35 international prizes including The Lister Institute Prize, The Royal Society Wolfson Award, The Netherlands Schellekens 2007 Prize, the 2017 DOHaD Hales Award, the 2021 Brown Prize Lecture from The Physiological Society and the President's Achievement Award 2024 from the Society for Reproductive Investigation (SRI). He is past President for the Fetal & Neonatal Physiological Society (FNPS) and is the President Nominee for the SRI meeting in Glasgow in 2027. Dino holds 3 Honorary Professorships (*Honoris Causa*) from the Universidad de Chile, the Pontificia Universidad Católica de Chile, and the Fourth Military Medical University in Xi'an, China. Current programmes of research use an integrative approach at the whole animal, isolated organ, cellular, and molecular levels to determine the role of fetal hypoxia and oxidative stress in setting an increased risk of cardiovascular disease in progeny. His work in human pregnancy in Bolivia investigates the impact of high-altitude hypoxia on maternal and fetal health. In 2018, he was awarded honorary Fellowships by distinction from the Royal College of Obstetrics & Gynaecology (FRCOG) and the Latin American Academy of Sciences, in recognition of the contribution of his research to the wellbeing of women and their children.

## Guest Speakers



### **Stephane L. Bourque, PhD**

Dr. Bourque is an Associate Professor in the Departments of Anesthesiology & Pain Medicine, Pharmacology and Pediatrics at the University of Alberta. He currently holds a Tier 2 Canada Research Chair in Maternal and Perinatal Physiology. He is currently co-leader of the Biomedical Global Health Research Network at the University of Alberta, and a

board member of the Canadian Society for the Developmental Origins of Health and Disease (DOHaD Canada), where he also chairs its Engagement, Communications and Outreach Committee. He is also a member of Sepsis Canada and was among the founding members of the National Preclinical Sepsis Program of Sepsis Canada.

His research program encompasses two broad areas of cardiovascular pharmacology. The first focuses on understanding how iron deficiency in pregnancy affects growth and development of the fetus, and in turn predisposes the offspring to cardiovascular disease in later life. Iron deficiency is the most common nutritional deficiency worldwide, and pregnant women and young children are among the most susceptible populations. Diagnosis and treatment for iron deficiency in pregnancy is deceptively complex, which is underscored by its prevalence despite widespread supplementation and food-fortification efforts. The goal of this work is to develop tools to diagnose iron deficiency and anemia earlier in pregnancy, and novel therapeutics to improve outcomes in these complicated pregnancies. The second focuses on elucidating mechanisms underlying the progression of cardiometabolic dysfunction in neonatal sepsis, as well as the lifelong cardiovascular consequences following recovery.

Dr. Bourque's research program is currently funded by the Canadian Institutes of Health Research, the Kidney Foundation of Canada, Sepsis Canada, and by the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.



## **Elizabeth E. Crouch, MD, PhD**

Dr. Crouch is a neuroscientist, a vascular biologist, and a physician in Neonatal-Perinatal medicine. Her lab, the Neurovascular Development lab at [crouclab.ucsf.edu](http://crouclab.ucsf.edu), studies how brain blood vessels grow and interact with other brain cells. In part, this interest is inspired from the preterm babies that she cares for clinically. Approximately 20% of preterm

babies born between 24-28 gestation weeks will develop germinal matrix hemorrhage (GMH). This hemorrhage can cause hydrocephalus, cerebral palsy, and death, and unfortunately there are currently no treatments. It remains unclear why vasculature in this developmental window is particularly sensitive. One critical barrier is the lack of a comprehensive understanding of the spatiotemporal dynamics of vascular cell development in the prenatal brain. Dr. Crouch's research revolves around defining the stages of vascular stem cells in the developing brain and understanding the mechanisms that regulate their functions. They then apply this knowledge to produce novel technologies and therapeutic strategies for different brain hemorrhages in neonatal and pediatric patients. Towards these goals, the Crouch lab utilize neuropathological specimens, flow cytometry (FACS), bioinformatics, and cell culture, including organoid models.

For fun, the Crouch lab run the [BreakingDownBiology](#) blog (also funded by UCSF ImmunoX) to explain exciting scientific journal articles with everyday language. Dr. Crouch also co-hosts "At the Bench: Neonatal Physician Scientists" for the Incubator Podcast network.

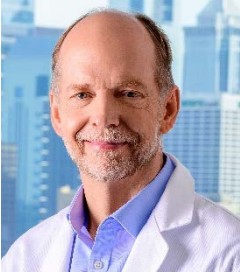


## **Andrea G. Edlow, MD, MSc**

Dr. Edlow is a physician investigator in the Vincent Center for Reproductive Biology at Massachusetts General Hospital, an Associate Professor of Obstetrics, Gynecology, and Reproductive Biology at Harvard Medical School and the Patricia and Scott Eston MGH Research Scholar 2024-2029. She received her BA in History from Yale College, a Master's of Science in Economic and Social History from Oxford University, and her MD from the Perelman School of Medicine at the University of Pennsylvania. She completed Obstetrics and Gynecology residency at the Massachusetts General Hospital/Brigham and Women's Hospital combined program, and a Maternal-Fetal Medicine fellowship at Tufts Medical Center/Tufts University School of Medicine.

Dr. Edlow has dedicated her career to understanding maternal immunity. A mother's exposures in pregnancy impact not only the mother, but also the placenta and the developing fetus, with potential short- and longer-term consequences. The Edlow Lab works to understand how in utero exposures affect fetal brain development, impacting risk for childhood neurodevelopmental disorders such as autism spectrum disorder, attention deficit hyperactivity disorder, or learning disabilities. The Edlow Lab also investigates maternal, placental and fetal immune responses to viruses and vaccines, and has assembled one of the largest COVID-19 in pregnancy biorepositories in the country.

In addition to being an investigator in the Vincent Center for Reproductive Biology and working as a Maternal-Fetal Medicine physician at MGH, Dr. Edlow serves as the vice chair of research for the Department of Obstetrics and Gynecology at MGH. A critical part of both her clinical and scientific work is providing training and mentorship to the next generation of physicians and scientists. Dr. Edlow has mentored more than 20 laboratory trainees, who have gone on to productive careers in academic medicine, science and the private sector.



## **Alan W. Flake, MD**

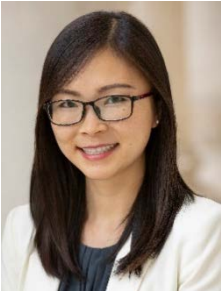
Dr. Flake is an attending surgeon in the Division of General Thoracic & Fetal Surgery at the Children's Hospital of Philadelphia where he holds the Ruth and Tristram C. Colket, Jr. Endowed Chair in Pediatric Surgery, is Vice Chair of Surgical Research, and acts as Director of the Center for Fetal Research. He is also

Professor of Surgery tenured track at the University of Pennsylvania School of Medicine.

Dr. Flake led a National Institutes of Health (NIH) funded research laboratory directed toward surgical correction of fetal anomalies and fetal stem cell and gene therapy for over 25 years. Under Dr. Flake's leadership, the Center for Fetal Research is exploring innovations in prenatal treatment, particularly in the areas of gene and stem cell therapy, and for life-threatening anatomic malformations and diseases. Recently, the Center has developed new technology for physiologic support of the extreme premature infant, a development that could have major implications for the treatment of prematurity.

Dr. Flake has published extensively with authorship of over 450 peer-reviewed publications and over 150 review articles and book chapters. Among other awards, he is the recipient of the 2021 March of Dimes Richard B. Johnson, Jr., MD Prize in Developmental Biology. Clinically, Dr. Flake actively participates as a Fetal Surgeon in the Fetal Diagnosis and Treatment Program at the Children's Hospital of Philadelphia with interests in fetal diagnosis and therapy, *in utero* stem cell and gene therapy, extracorporeal support of the extreme premature infant (the artificial placenta/uterus), and minimally invasive neonatal and pediatric surgery.





## Mancy Tong, PhD

Dr. Tong is an Assistant Professor in the Department of Obstetrics, Gynecology and Reproductive Sciences at Yale School of Medicine. She completed her PhD training in Obstetrics and Gynecology in the University of Auckland, New Zealand and her postdoctoral training in Reproductive Immunology at Yale. Dr. Tong's driving passion in biomedical research is in understanding the

early causes and pathophysiology of obstetric diseases, including miscarriage and preeclampsia, with the goal to identify novel biomarkers and therapeutic targets to improve lifelong outcomes for affected women and their babies.

Dr. Tong has conducted basic research in Obstetrics and Gynecology for over a decade and has experience in human placental development, endometrial biology, extracellular vesicle signaling and innate immunology at the maternal-fetal interface. She has authored over 40 peer-reviewed publications and have won multiple national and international awards for her research. Dr. Tong's NIH-funded laboratory currently focusses on examining the impacts of early maternal viral exposure and resultant inflammation on the formation of the maternal decidua in preparation for implantation, and the downstream effects on pregnancy success.

In addition to conducting impactful translational research in Obstetrics and Gynecology, Dr. Tong is passionate about mentorship and chairs the Society for Reproductive Investigation Career Development Committee. Dr. Tong is also an Associate Editor for Human Reproduction Update and Trophoblast Research, and serves as an *ad hoc* reviewer for numerous other journals in the field.

## **7<sup>th</sup> Annual Longo Symposium Committee**

William J. Pearce, PhD, Chair

Arlin B. Blood, PhD

Stella Goulopoulou, PhD

Nataliia Hula, PhD

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