LOMA LINDA UNIVERSITY

School of Medicine

THE LAWRENCE D. LONGO, MD CENTER FOR PERINATAL BIOLOGY 4TH ANNUAL LONGO SYMPOSIUM

February 1, 2022

8:30 am – 4:30 pm

Welcome

Lubo Zhang, PhD, Director

It is with great excitement that we resume the 4th Annual Longo Symposium after the suspension in 2021 due to the COVID-19 pandemic. We are very grateful to the speakers for their enthusiasm to participate and contribute to the exciting and first-rate program of the symposium.

The Lawrence D. Longo, MD Center for Perinatal Biology was founded by Dr. Lawrence D. Longo in 1972. Over the past five decades, it has developed into a world renowned research Center in the field of maternal and developmental physiology. Today, our Center consists of 13 full members of biomedical scientists and 3 associate members from clinical departments, devoted to investigation of the biology of maternal health, fetal development and newborn well-being in programming of health and disease, and 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 members of the Center are national and international leaders in maternal and fetal/neonatal physiology, endocrinology and neurobiology, and are experts in their individual disciplines.

This annual symposium honors Dr. Longo's legacy in our Center and Loma Linda University. The Longo Symposium has had great success since its inception in 2018. 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 developmental programming of health and disease. 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.

Welcome to the 4th Annual Longo Symposium, and thank you for joining us.

Thank you.

Symposium Program

8:30 – 8:35 am	**Introduction** **Lubo Zhang, PhD, Director,** **Lawrence D. Longo, MD Center for Perinatal Biology, Loma Linda University**
8:35 – 8:45 am	**Welcome and Opening Remarks** **Tamara Thomas, MD, Dean, School of Medicine, Loma Linda University**
8:45– 9:45 am	**Keynote Address** ***Maternal Diabetes and the Roles of Cellular & Environmental Stress: Challenges and Opportunities*** **E. Albert Reece, MD, PhD, MBA, Dean, University of Maryland School of Medicine**
9:45 – 10:00 am	**Break**
10:00 – 10:50 am	***Placental Accreta and Cell Free DNA*** **Julie C. Baker, PhD, Stanford University**
10:50 – 11:40 am	***Fetal Glucagon and Alpha-cells are Homeostatic Regulators of Uterine Blood Flow and Placental Function*** **Paul J. Rozance, MD, University of Colorado School of Medicine**
11:40am – 1:30 pm	**Lunch**
1:30 – 2:20 pm	***Epigenetics: The Yin and Yang of Fetal Programming*** **Rebecca A. Simmons, MD, University of Pennsylvania School of Medicine**
2:20 – 3:10 pm	***A New Mechanism of Fetomaternal Tolerance*** **Adrian Erlebacher, MD, PhD, University of California San Francisco**
3:10 – 3:25 pm	**Break**
3:25 – 4:15 pm	***Human Reproductive Success at High Altitude: An Evolutionary Tale*** **Stacy Zamudio, PhD, Placenta Research, LLC**
4:15 – 4:30 pm	**Closing Remarks** **Steven Yellon, PhD, Associate Director,** **Lawrence D. Longo, MD Center for Perinatal Biology, Loma Linda University**

Keynote Speaker

E. Albert Reece, MD, PhD, MBA, FACOG

Dr. E. Albert Reece is Executive Vice President for Medical Affairs at the University of Maryland, and Dean of the School of Medicine. He also is the John Z. and Akiko K. Bowers Distinguished Professor. He is a member of the prestigious National Academy of Medicine (NAM) of the National Academy of Sciences. In addition, Dr. Reece is a Professor in the Departments of Obstetrics, Gynecology and Reproductive Sciences; Internal Medicine, and Biochemistry & Molecular Biology, and oversees an active multi-million dollar NIH-funded research program. His laboratory studies the biologic/molecular causes and consequences of diabetes-induced birth defects, and currently is developing experimental methods for preventing such birth defects. He has over 500 publications. A native of Jamaica, West Indies, Dr. Reece received a Bachelor of Science degree with honors (*Magna Cum Laude*) from Long Island University and an MD degree from New York University School of Medicine; completed his residency in OB/GYN at Columbia University Medical Center, and a fellowship in maternal-fetal medicine at Yale University School of Medicine. In addition, he has a PhD degree in Biochemistry from the University of the West Indies, Kingston, Jamaica; and an MBA degree from the Fox School of Business & Management at Temple University in Philadelphia, Pennsylvania. He was a member of the Yale faculty for almost 10 years before being recruited to serve as the Abraham Roth Professor and Chair of Obstetrics and Gynecology at the Temple University School of Medicine. Prior to joining the University of Maryland School of Medicine, he served as Vice Chancellor and Dean of the University of Arkansas College of Medicine.

Guest Speakers

Julie C. Baker, PhD

Dr. Baker is Professor of Genetics at Stanford University. She has been awarded grants throughout her career from NIH, CIRM and private foundations to apply genomic technologies to examine the biology of cells, particularly how they communicate and function during fetal development. Dr. Baker is a developmental biologist and classically trained embryologist. The work in her laboratory focuses on the establishment of specific cell fates using genomics to decipher interactions between chromatin and developmental signaling cascades, between genomes and rapidly evolving cell types, and between genomic copy number variation and gene expression. In recent years, her laboratory has focused on the vastly understudied biology of the trophoblast lineage, particularly the evolutionary mechanisms underlying placentation how they led to pregnancy diseases in human. Dr. Baker is proud to be a teacher of medical students, graduate students and undergraduate students. She has trained 30 graduate students and postdoctoral fellows in her own laboratory, all of which are highly successful in and out of the academic setting. She also teaches a freshman course called 'Thinking Matters; living with viruses' and is developing a graduate course called 'Identity, Sickness and Eugenics'.

Paul J. Rozance, MD

Dr. Rozance is a Professor at the University of Colorado, School of Medicine in the Section of Neonatology and is currently the Frederick Battaglia Chair in Neonatology Research. He is a Neonatologist Clinician-Scientist and the Scientific Director of the Perinatal Research Center. His laboratory focuses on fetal nutrient and oxygen physiology, fetal endocrinology, fetal growth and development, pancreatic beta-cell biology, and placental function. His research goals include developing a better understanding how the fetus translates nutrient signals from the placental into anabolic signals for growth, specifically insulin secretion. These translational studies revolve around the broad area of perinatal insulin-nutrient metabolism and have led to his clinical interest in glucose metabolism during the transition from intrauterine to extrauterine life.

Rebecca A. Simmons, MD

Dr. Simmons obtained her MD at the University of Arizona and completed her residency in Pediatrics at the Arizona Health Sciences Center at the University of Arizona. After a fellowship in neonatology at the Cardiovascular Research Institute at UCSF, she served on the faculty of Northwestern University Medical School in Chicago. Currently, Dr. Simmons is the Hallam Hurt Professor of Pediatrics at the Perelman School of Medicine at the University of Pennsylvania and Children's Hospital of Philadelphia and the Associate Chair of Faculty Affairs. She is the Deputy Director of the NIEHS funded Center for Excellence in Environment and Toxicology, and a PI of the March of Dimes Prematurity Research Center at the University of Pennsylvania. Her research program is focused on elucidating the mechanisms by which an adverse intrauterine milieu is associated with intrauterine growth restriction, diabetes or obesity in pregnancy, and exposure to chemicals such as endocrine disruptors cause the later development of diseases such as obesity and diabetes. She has established a number of animal models in the rodent including intrauterine growth restriction, maternal obesity, and maternal exposure to endocrine disruptors. These animal models induce obesity, beta-cell and hepatic dysfunction in the offspring, ultimately leading to the development of obesity and diabetes. Using these different animal models her lab is elucidating the role of epigenetic mechanisms in the development of an abnormal phenotype in the offspring in the ß-cell, liver, fat, and brain. Using next generation sequencing, she is also assessing how an altered maternal milieu impacts the epigenome and the transcriptome and the underlying molecular mechanisms that induce genome-wide epigenetic modifications at a single-cell level in the very early embryo and placenta as well as in offspring later in life.

Adrian Erlebacher, MD, PhD

Adrian Erlebacher is a Professor of Laboratory Medicine at the University of California San Francisco (UCSF). He received his B.S. degree from Yale University, and his M.D. and Ph.D. degrees from UCSF. Dr. Erlebacher joined the faculty of the Department of Pathology at the NYU School of Medicine in 2006, and then moved back to UCSF in 2016 to join the Department of Laboratory Medicine. He is a member of the UCSF ImmunoX program, the UCSF Center for Reproductive Sciences, and the UCSF Biomedical Sciences (BMS) Graduate program. Work in his laboratory lies at the intersection of immunology and developmental biology. In particular, his lab is interested in how the developmental properties of the uterus influence its ability to mount successful immune responses, and, conversely, how cells of the immune system influence uterine tissue development and remodeling. One major focus has been on the paradox of fetomaternal tolerance, i.e. how the fetus and placenta avoid being rejected by the maternal immune system during pregnancy. His lab also works on how epigenetic processes within the decidua enforce uterine quiescence prior to labor onset, and then, conversely, contribute to labor onset. The topics studied in the Erlebacher lab have implications for early pregnancy loss, preterm labor, preeclampsia, and other disorders of maternal/fetal health.

Stacy Zamudio, PhD

Dr. Zamudio was, until her recent retirement, Senior Scientist and Director of Research, Department of Obstetrics and Gynecology, and the Center for Abnormal Placentation at Hackensack University Medical Center. She was also Professor of Obstetrics and Gynecology, Hackensack-Meridian School of Medicine, and Adjunct Associate Professor of Community-Based Medicine and Epidemiology at the University of Medicine and Dentistry of New Jersey-New Jersey Medical School. She most recently completed a 5-year NIH Collaborative U01(2015-2020), jointly with Oxford University (UK) and funded by the NIH Human Placenta Project/Office of the NIH Director. She has served as elected President of the Perinatal Research Society (PRS 2013), Council Member for the Society for Reproductive Investigations (SRI 2013-2017) and Secretary of the International Federation of Placenta Associations (IFPA 2012-2015). Dr. Zamudio was trained in Evolutionary Biology/Anthropology at the University of California Los Angeles and completed her PhD in Anthropology at the University of Colorado in Boulder. Post-doctoral training was completed in the Cardiovascular Pulmonary Research Laboratory at the University of Colorado, Denver, Health Sciences Center. Dr. Zamudio has long been involved in human studies of pregnancy physiology, the role of the placenta in modulation of fetal growth and of placental hypoxia in preeclampsia. She was an early adopter/developer of applied ultrasound for quantification of blood flows and oxygen and nutrient delivery in mother and fetus. Her early work showed that the normal physiological changes of pregnancy in women with normal birth outcomes at high altitude are phenotypically intermediate between preeclampsia and normal sea level pregnancy. Subsequently, she and UK, Canadian and Australian colleagues compared high-altitude with preeclamptic placenta to discriminate between adaptive responses to hypoxia and the pathological features of preeclampsia. This resulted in a novel theory concerning the development of fetal growth retardation via a conserved evolutionary molecular mechanism, now known as Placental Metabolic Reprogramming. Her later and current work has been focused on the placental over-invasion pathology, Placenta Accreta Spectrum (PAS), which her group proposed as the antithesis (at a molecular level) of the placental extravillous trophoblast under-invasion characteristic of preeclampsia. Along with her 20-year research partner, Dr. Nicholas Illsley, the laboratory has developed models comparing the transcriptomics and methylomics of placental extravillous trophoblast in PAS and preeclampsia.