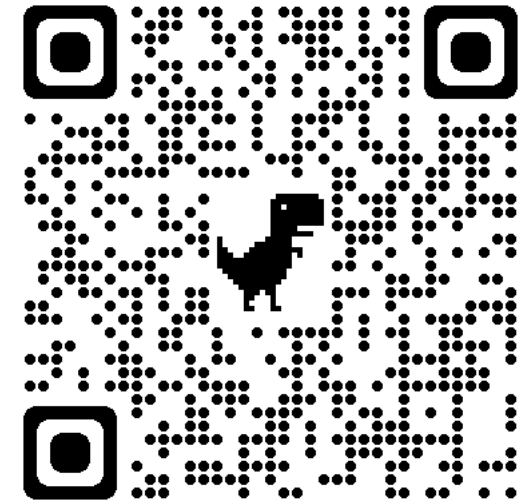


Basic Training in Reproductive Medical Genetics



From DNA to Patient Care: Building Your Genetics Foundation

Meet the Foundation for Reproductive Genetics Education (FoRGE) team

Course Co-Directors

Ronald Wapner, MD
Columbia University

Mary Norton, MD
U. of California, San Francisco

Britton Rink, MD
Mount Carmel Health

Course Co-Facilitators

Janice Edwards, MS, CGC

Melissa Stosic, MS, CGC,
ACRP-CP

FoRGE, a non-profit organization

Our Mission

To provide unbiased, comprehensive education on reproductive genetics and genomics to healthcare providers.

Our Vision

All clinicians who practice reproductive medicine will have a strong foundation in medical genetics and genomics.

Course Faculty

Clinicians, PhD laboratory specialists,
genetic counselors, others

Over 80 faculty from across the U.S. and globally

- MD 31
- PhD 12
- MD/PhD 9
- GC 25
- and more...



The Faculty

These faculty donated their time and expertise in recorded and LIVE content. We are grateful for these experts, who each contributed to the vision of an outstanding online reproductive medical genetics education resource. These faculty have made Basic Training a reality.

Faculty from
across the U.S.
and globally

Vimla Aggarwal, MBBS

Paul S. Appelbaum, MD

Caitlin Baptiste, MD

Andrea Besser, MS, CGC

Les Biesecker, MD

Joseph Biggio, Jr, MD, MS

Kara Bui, MS, CGC

Lyn Chitty, MD

Wendy Chung, MD, PhD

Pe'er Dar, MD

Sandra Darilek, MS, CGC

Panchu Deshpande, MS

Jamie Dokson, MS, LCGC

Lorraine Dugoff, MD

Michael Duyzend, MD,,PhD

Jessica Fairey, MS, CGC

Cori Feist MS, CGC

Lindsay Freud, MD

Stephanie Galloway, MS, CGC

Kelly Gilmore, MS, CGC

Jessica L. Giordano, MS, CGC

Francesca Romana Grati, PhD

Kathryn J. Gray, MD, PhD

Nina Harkavy, ScM, CGC

Columbia University

Columbia University

Columbia University

New York University

National Human Genome Research Institute

Ochsner Health

Caris Life Sciences

UCL Great Ormond Street Institute of Child Health

Columbia University

Albert Einstein College of Medicine

Baylor College of Medicine

Columbia University

Kaiser Southeast Permanente Medical Group

University of Pennsylvania

Massachusetts General Hospital

University of South Carolina

Oregon Health & Science University

The Hospital for Sick Children

Columbia University

University of North Carolina-Chapel Hill

Columbia University

TOMA Advanced Biomedical Assays S.p.A., Impact Lab

Brigham and Women's Hospital

Columbia University

Continuous growth and improvement



# attendees	2019	2020-21	2021-22	2022-23	2023-beyond
	30	119	102	119	154+

- In 2025-26, we have 167 participants, bringing total to >800
- In 2026, we are offering a course tailored to practicing OB providers
- Interest from providers in 35 countries reflects the need for global reach

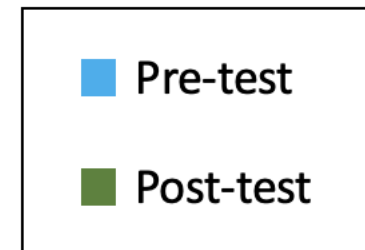
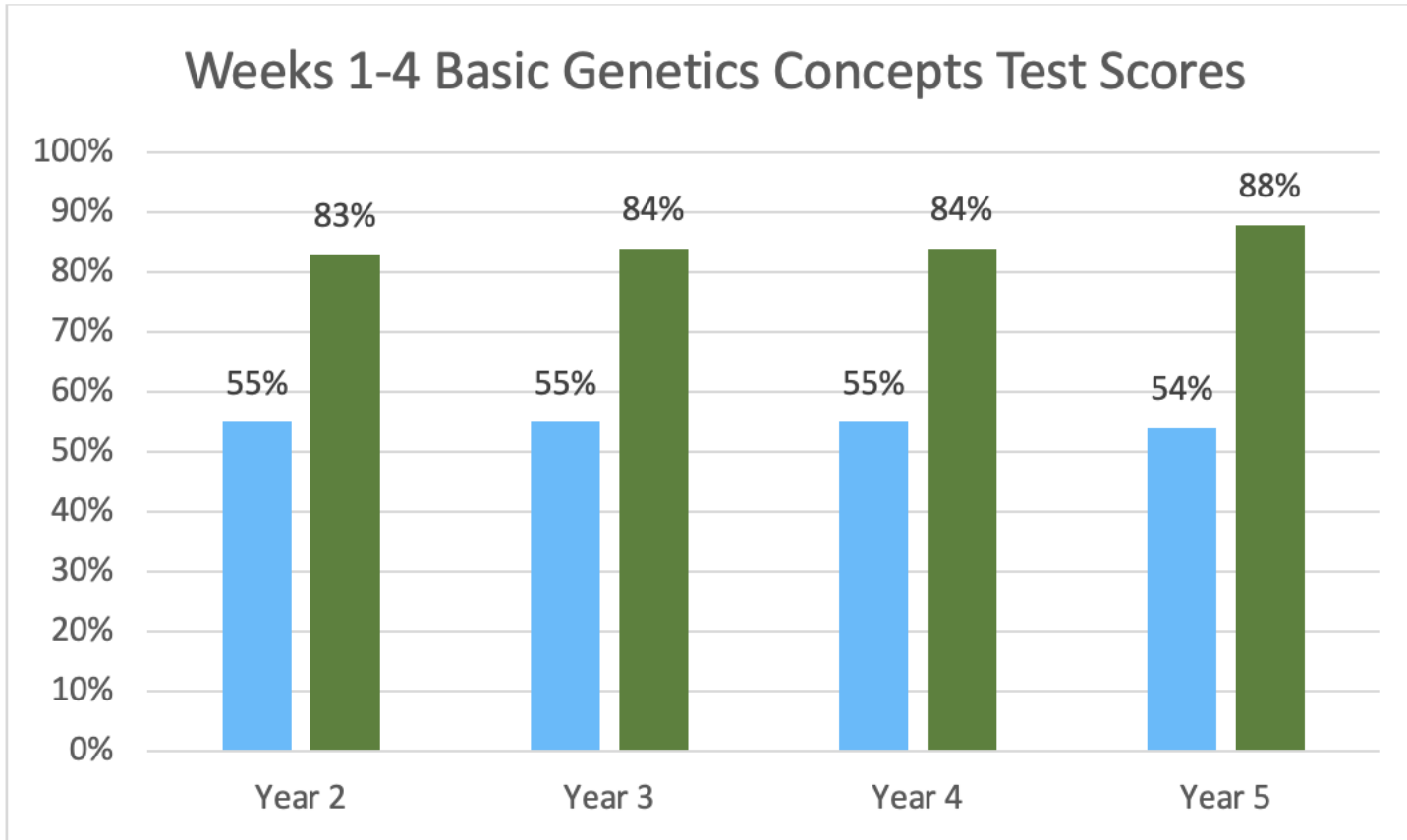
Our experience with MFM and REI fellows shows improvement in genomics knowledge

Pre- and post-test scores for the most recent course offering:

2024-25	Weeks 1-4		Weeks 5-8	
	PRE-test	POST-test	PRE-test	POST-test
Average score	56%	88%	59%	95%
Median score	57%	92%	61%	97%

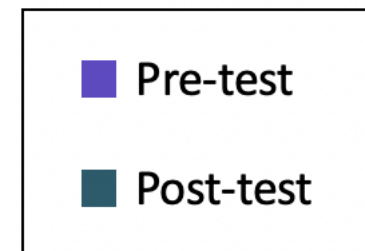
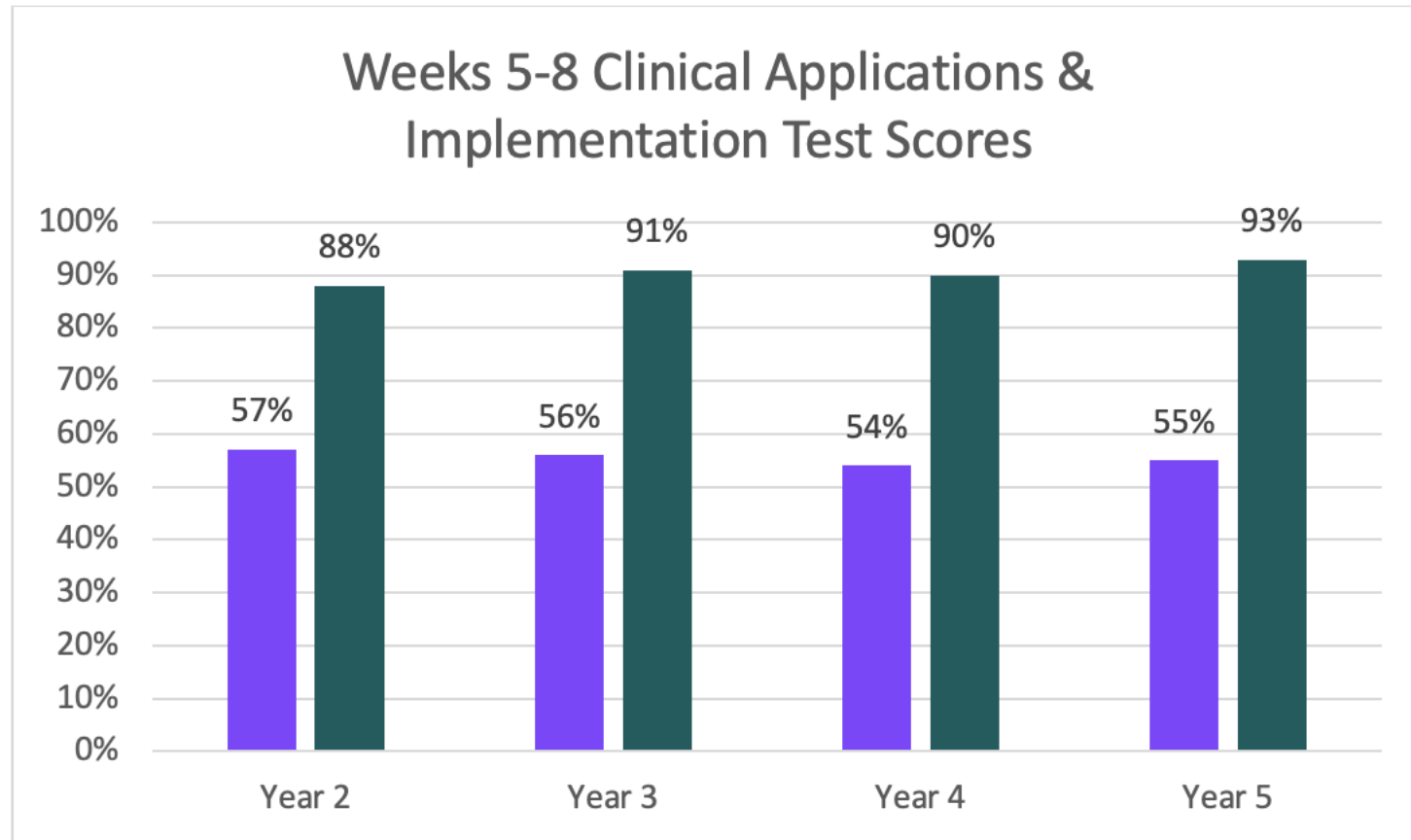
Pre- and Post-Test Results

Knowledge gained is not dependent on topic or learner cohort



Pre- and Post-Test Results

Knowledge gained is not dependent on topic or learner cohort



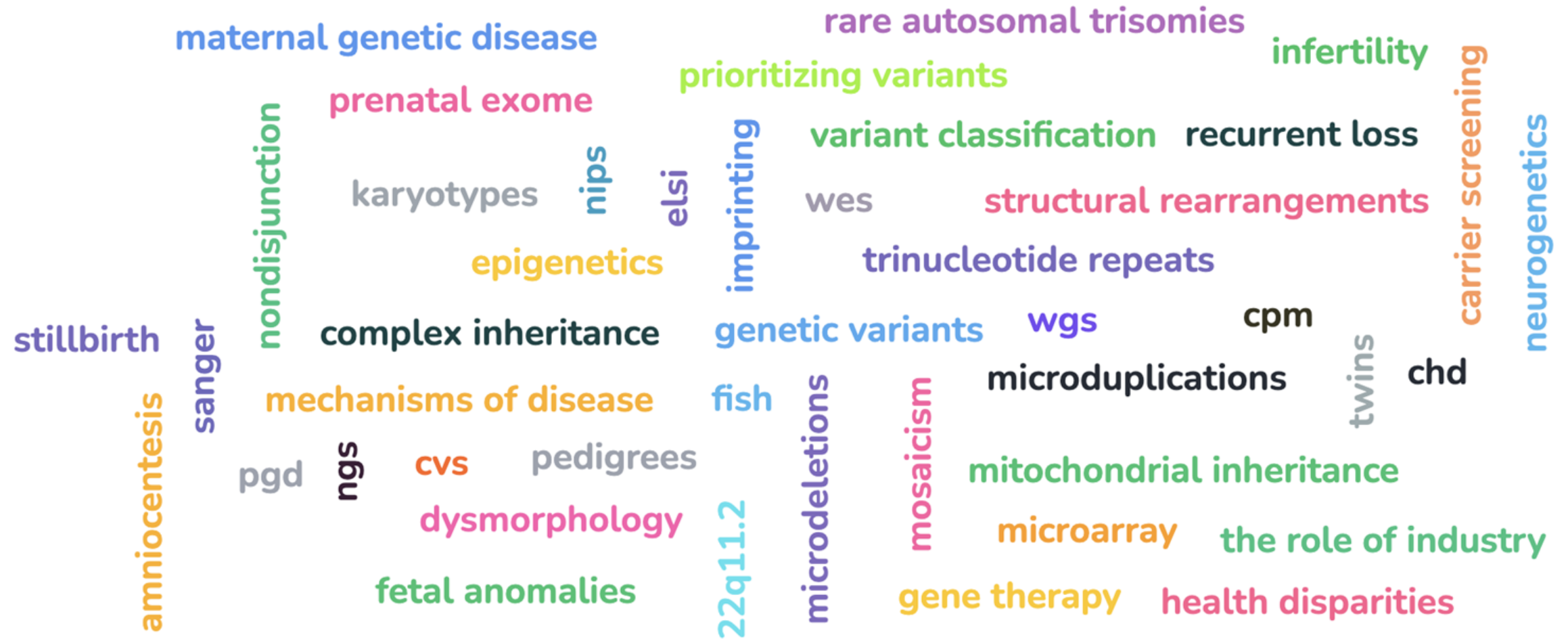
New courses dedicated to obstetric care providers

New content
relevant to a
global
audience

Comprehensive
content with top-
tier faculty

Includes a
**FOUNDATIONAL
COURSE** and
**SPECIALIZED
CLINICAL
APPLICATIONS**

Covers a broad range of genomic topics relevant to prenatal care providers



Learning Outcomes: Foundations in Genomics

1. Identify **genetic mechanisms** and **modes of inheritance** underlying disease.
2. **Differentiate genetic testing methods** used in diagnostic evaluation and clinical decision-making.
3. **Formulate a prenatal screening and diagnostic plan**, considering the clinical utility, performance, benefits, and limitations of testing approaches.
4. Apply genetic principles to case management, including **pedigree interpretation and evaluation of genetic risk**.

Learning Outcomes: Specialized Clinical Applications in Genomic Medicine

1. Describe **prenatal exome and genome variant classification and types of variants**, including variants of uncertain significance, and secondary and incidental findings.
2. Integrate genetic testing strategies into **clinical decision-making for ultrasound-detected anomalies**.
3. Apply genetic concepts into **preimplantation genetic testing, evaluation of infertility and pregnancy loss, and management of maternal genetic diseases**.
4. Describe and discuss the current and evolving **ethical, legal, and social issues** in reproductive medical genetics.

Schedule designed to teach and reinforce key concepts

Content is available online for 1 year, allowing for asynchronous learning.

Lecture-Learn from Genetics Experts

Workshop-Demonstration of Concepts

Case Presentation- Real Life, Real Cases

Quiz Questions-Check Learning

Supplemental Reading-Online Videos & Professional Literature

Discussion Board-for Questions

Foundations curriculum: Weekly content example

Week 2					
Lectures	<p>1. Clinical Consequences of Constitutional Chromosome Abnormalities Part 1: Autosomal Aneuploidy</p> <p>2. Clinical Consequences of Constitutional Chromosome Abnormalities Part 2: Sex Chromosome Aneuploidy</p> <p>3. Clinical Consequences of Constitutional Chromosome Abnormalities Part 3: Rearrangements</p> <p>4. Origins of Chromosomal Mosaicism in Humans</p> <p>Lecturer: Brynn Levy</p>	<p>1. Cytogenomic Microarray in Prenatal Diagnosis - Part 1</p> <p>2. Cytogenomic Microarray in Prenatal Diagnosis - Part 2</p> <p>3. Cytogenomic Microarray in Prenatal Diagnosis - Part 3</p> <p>Lecturer: Arun Witta</p>	<p>1. Dysmorphology</p> <p>2. The First Trimester Genetic Sonogram</p> <p>Lecturer: Wendy Chung (1); Simon Meagher (2)</p>	<p>1. Case Studies: Common Karyotype Findings</p> <p>2. Case Studies: Common Microarray Findings</p> <p>3. Clinical Utility: Karyotype & Microarray</p> <p>4. POC Testing and Common Findings</p> <p>Lecturer: Ignatia Van den Veyver (1-3), Zev Williams (4)</p>	<p>1. Introduction to Laboratory Methods</p> <p>2. Laboratory Methods for Detection of SNVs</p> <p>3. Genotyping & Sequencing</p> <p>4. Next Generation Sequencing</p> <p>Lecturer: Vimla Aggarwal</p>
Workshops	<p>Workshop: Mechanisms of Disease Aneuploidy and Translocations Case Series: From the Embryo to the Fetus</p> <p>Workshop Leader: Brynn Levy</p>	<p>Workshop: Visualize and Interpret PGT, FISH, Karyotype, & Microarray Results</p> <p>Workshop Leaders: Katie Gray & Angie Jelin</p>	<p>Additional Lecture: PGT-A Clinical Outcomes</p> <p>Lecturer: Heather Huddleston</p>	<p>Workshop: Pre- and Postnatal Phenotype of 22q11.2 Deletion Syndrome</p> <p>Workshop Leader: Lindsay Freud</p>	
GC Case Presentations		Abnormal Microarray Case		Abnormal Ultrasound Case	
Supplemental Materials					
Quiz of the Day	Case Based Quiz	Case Based Quiz	Case Based Quiz	Weekly Quiz with Review of Answers	

Specialized Clinical Applications curriculum: Weekly content example

Week 3					
Lectures	<p>1. Embryology of the Genitourinary System (17:53)</p> <p>2. Fetal Anomalies of the Kidneys and Urinary Tract (31:07)</p> <p>3. Fetal Genital Anomalies (Disorders of Sex Reversal, Disorders of Sexual Development (43:31)</p> <p>Lecturers: Barbie Klein (1); Tom Hays (2); Brian Shaffer (3)</p>	<p>1. Fetal Anomalies: Hydrops and Lymphatic Abnormalities (27:33)</p> <p>2. The underlying etiologies of intrathoracic and abdominal fetal abnormalities (19:29)</p> <p>3. Craniofacial (17:18)</p> <p>Lecturers: Teresa Sparks (1); Angie Jelin (2); Katie Gray (3)</p>	<p>1. Skeletal/ Arthrogyposis (38:18)</p> <p>2. Prenatal presentation: Non-skeletal collagen disorders (30:52)</p> <p>3. Fetal Anomalies: Whole Exome Sequencing in the Diagnosis of Major Brain Anomalies (16:00)</p> <p>Lecturers: Lorraine Dugoff (1); Billie Lianoglou & Kate Swanson (2); Yuval Yaron (3)</p>	<p>1. Prenatal Presentation: Rasopathies (31:39)</p> <p>2. Prenatal presentation: Ciliopathies (28:32)</p> <p>3. Congenital Diaphragmatic Hernia (20:26)</p> <p>Lecturers: Jessica Giordano (1); Billie Lianoglou (2); Wendy Chung (3)</p>	<p>1. Fetal Anomalies: Genomic Causes of Broken Hearts (23:46)</p> <p>1. The Genetics of Congenital Heart Disease (34:59)</p> <p>3. The Role of the Pathologist in Expanding Fetal Phenotypes (31:27)</p> <p>4. Perinatal Palliative Care (30:45)</p> <p>Lecturers: Wendy Chung (1); Lindsay Freud (2); Louise Wilkins-Haug (3); Elvira Parravicini (4)</p>
Workshops			<p>Workshop: Genetic Counseling Case Series (1:24)</p> <p>Lecturers: Lianoglou, Billie & Gilmore, Kelly & Giordano, Jessica</p>	<p>Workshop: A Wolf in Sheep's Clothing</p> <p>Lecturers: Teresa Sparks & Anne Mardy</p>	<p>Workshop : Evaluation of the Fetus (putting pieces of phenotype together)</p> <p>Lecturer: Parks, Tony & Shannon, Patrick</p>
GC Case Presentations		Ultrasound Anomaly Case		Case-based Learning: Guess the Condition	
Supplemental Materials					
Quiz of the Day	Case Based Quiz	Case Based Quiz	Case Based Quiz	Weekly Quiz with Review of Answers	

Advantages of the Online Learning Environment

- Pre- and Post-tests to assess knowledge
- Participants can navigate content based on interests
- Content available for approximately one year
- Certificate of completion upon request
- Course Co-Facilitators available to assist

Acknowledgements

- Over 80 faculty have donated their time and expertise
- University of California San Francisco and Columbia University, in-kind
- Fetal Medicine Foundation - Dr. Kypros Nicolaides
- Drs. Katia Bilardo & Francesca Grati
- Unrestricted educational grants:
 - Illumina, Natera, Fulgent, Billion-to-One
LabCorp, Invitae, Myriad, Eurofins, Juno Diagnostics

Course offerings

Foundations in Genomics

January 5, 2026

Register by December 15, 2025

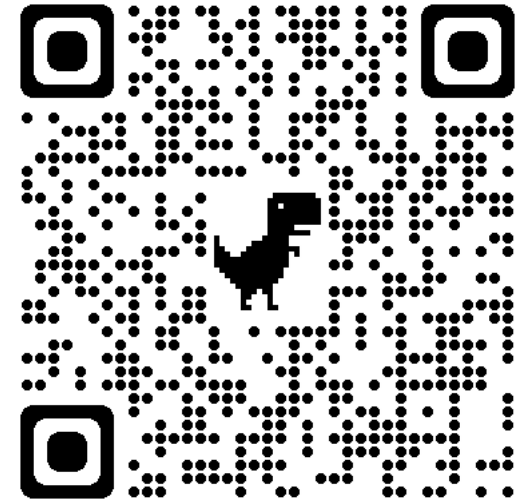
Specialized Clinical Applications in Genomics

April 6, 2026

Register by March 15, 2026

Tuition is \$500 US for each course (\$1000 US for both)

Questions? Email jedwards@uscmed.sc.edu



<https://mfprecision.ucsf.edu/basic-training/>