2017 | ACMG Annual Clinical Genetics Meeting

ACMG American College of Medical Genetics and Genomics
Translating Genes Into Health®

48th Annual March of Dimes Clinical Genetics Conference - The Undiagnosed Diseases Network; Changing the Paradigm of Rare Disease Diagnosis, Treatment and Research

Held in Phoenix, Arizona, March 21-25, 2017

Date of Release: April 3, 2017
Expiration Date: April 3, 2020 (CME, NSGC, P.A.C.E.®)
Estimate Time of Completion: 2 hours
Course must be completed by the expiration dates

COURSE DESCRIPTION

The Undiagnosed Diseases Network (UDN) is a recently constituted multi-institution collaborative network designed to help patients who have rare, previously undiagnosed diseases. In addition to facilitating diagnosis and management for patients and their families, the network has a broader goal to create a new, more effective paradigm for rare disease diagnosis and research. Some of the important objectives of the network are to expand the breadth of expert collaborators, to determine best practices for translating this work into geographically diverse mainstream clinical centers, and to share resulting data and approaches throughout the scientific community. This session will describe lessons learned in, a) setting up a collaborative network which has clinical as well as research functions, b) evaluation of pediatric patients in the network, c) evaluation of adult patients in the network, d) patient engagement in the network activities and e) organizing clinical laboratory cores to optimize molecular diagnosis.
Rare and yet-to-be-described disorders are a difficult problem for patients, their families and their physicians. The NIH Office of Rare Diseases Research notes that about 6% of patients seeking their assistance have an undiagnosed disease. For those who were ultimately diagnosed, as many as 15% had persistent symptoms without diagnosis for at least 5 years, a difficult and costly delay for patient, family, and physicians who struggle to identify and treat these disorders. The various network components will work together to advance laboratory and clinical research by enhancing the coordination and collaboration between the bedside and bench across multiple centers by sharing broadly resulting data and approaches widely throughout the scientific community. The large number of unique patients, the breadth of the expertise in the network, and the highly collaborative nature of the UDN represents a signal opportunity to accelerate discovery about health and disease at scale, while challenging the traditional divide between clinical and research activities.
Attendees will benefit from learning about the logistics underpinning of the network and how to utilize the many tools and resources developed by the network in their own practice
Dr. Liz Worthey (The Use of Clinical Sequencing in the UDN) declined to release her slides but you will be able to listen to her presentation.

LEARNING OBJECTIVES

At the conclusion of this course, participants should be able to:

- Explain how collaborative networks function and how that knowledge is leveraged provide better patient care
- Describe how UDN is using new phenotyping and sequence analyses tools for improved diagnosis and downstream translational research
- Describe how the UDN is engaging patients in this mission
- Explain how to proceed forward when and N=1 diagnosis is reached
- Utilize the many tools and resources developed by the network in their own practice

TARGET AUDIENCE

All healthcare professionals interested in the diagnosis, management, treatment and prevention of genetic conditions and increasing their understanding of the genetic basis of common, chronic health problems affecting both children and adults will find the programming applicable to their practice. These select sessions from the ACMG Annual Meeting are targeted for the following professionals:

- Medical and clinical geneticists
- Physicians of all specialties with an interest in genetics, genomics and the genetic basis of disease
- Genetic counselors
- Laboratory geneticists, directors, technicians and technologists
- Researchers
- Pathologists
- Educators
- Nurses
- Dietitians
- Physician assistants
- Biotechnology and pharmaceutical development professionals
- Fellows, Trainees and Students
- Public health professionals
- Genetic/consumer advocates
- Others with an interest in the science and art of medical genetics and genomics

SESSIONS

- From Concept to Practice: Development of the UDN- William Gahl, MD PhD,
- Illustrative Cases from the UDN - Brendan Lee, MD, PhD, FACMG, FAAP
- Taking Action After an n=1 Diagnosis- David Goldstein, PhD
- The Use of Clinical Sequencing in the UDN- Liz Worthey, PhD

Accreditation:

The American College of Medical Genetics and Genomics is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Credit Designation:

The American College of Medical Genetics and Genomics designates this activity for a maximum of 2 *AMA PRA Category 1 Credit*s™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Genetic Counselor Credit

The National Society of Genetic Counselors (NSGC) has authorized American College of Medical Genetics and Genomics to offer up to 2 Category 1 contact hours for this OnDemand course. The American Board of Genetic Counseling (ABGC) will accept CEUs earned for this course for the purposes of genetic counselor certification and recertification. Reporting of credits is sent to NSGC quarterly. Additional fee (~$25) applies for NSGC credit that is billed by NSGC.

P.A.C.E. CEUs – Laboratory Directors and Laboratory Personnel

ACMG is approved as a provider of continuing education programs in the clinical laboratory sciences by the American Society for Clinical Laboratory Science (ASCLS) Professional Acknowledgment for Continuing Education (P.A.C.E.®) Program. The American College of Medical Genetics and Genomics designates this course for a maximum of 2 contact hours. ACMG is approved by the Florida Board of Clinical Laboratory Personnel as CE Provider. ACMG is approved by the California Department of Health Services through the ASCLS P.A.C.E.® Program as CE Provider #275.

HIPAA Compliance

The ACMG supports medical information privacy. While the ACMG is not a "covered entity" under HIPAA 1996 and therefore is not required to meet these standards, ACMG wishes to take reasonable steps to ensure that the presentation of individually identifiable health information at ACMG-sponsored events has been properly authorized. All presenters have completed a form indicating whether they intend to present any form of individually identifiable healthcare information. If so, they were asked either to attest that a HIPAA-compliant consent form is on file at their institution, or to send ACMG a copy of the ACMG HIPAA compliance form. This information is on record at the ACMG Administrative Office and will be made available on request.

Content Validation

ACMG follows the ACCME policy on Content Validation for CME activities, which requires:

Content Validation and Fair Balance

1. ACMG follows the ACCME policy on Content Validation for CME activities, which requires:
   a) All recommendations involving clinical medicine must be based on evidence that is accepted within the profession of medicine as adequate justification for their indications and contraindications in the care of patients.
   b) All scientific research referred to, reported or used in CME in support or justification of patient care recommendations must conform to the generally accepted standards of experimental design, data collection and analysis.

2. Activities that fall outside the definition of CME/CE; "Educational activities that serve to maintain, develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession" (source: ACCME and AMA) will not be certified for credit. CME activities that promote recommendations, treatment, or manners of practicing medicine or pharmacy that are not within the definition of CME/CE or, are known to have risks or dangers that outweigh the benefits or, are known to be ineffective in the treatment of patients.
3. Presentations and CME/CE activity materials must give a balanced view of therapeutic options; use of generic names will contribute to this impartiality. If the CME/CE educational materials or content includes trade names, where available, trade names from several companies must be used.

Off-label Uses of Products

When an off-label use of a product, or an investigational use not yet approved for any purpose, is discussed during an educational activity, the accredited sponsor shall require the speaker to disclose that the product is not labeled for the use under discussion, or that the product is still investigational. Discussions of such uses shall focus on those uses that have been subject of objective investigation.

Disclaimer: *ACMG educational programs are designed primarily as an educational tool for health care providers who wish to increase their understanding of the application of genomic technologies to patient care. The ACMG does not endorse, or recommend the use of this educational program to make patient diagnoses, particular by individuals not trained in medical genetics. Adherence to the information provided in these programs does not necessarily ensure a successful diagnostic outcome. The program should not be considered inclusive of all proper procedures and tests or exclusive of other procedures and tests that are reasonably directed at obtaining the same results. In determining the propriety of any specific procedure or test, a healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen.*

2017 ACMG Program and Education Committee Members Disclosures

Members of the ACMG Staff, Education and Program Committees involved in planning the 2017 ACMG Annual Clinical Genetics Meeting are required to disclose relevant relationships which could be perceived by some as a real or apparent conflict of interest in planning. All disclosures have been reviewed and conflicts of interest resolved by the Education Committee COI sub-committee or the Executive Director and CME Associate Director and conflicts of interest are disclosed. In the cases where a conflict existed then the committee member refrained from the discussion.

Following is a list of program and education committee members who have disclosed one or more such relationships and names of companies with which those relationships exist:

EC = Education Committee; PC = Program Committee; S = ACMG Staff

1. Major stockholder/ownership interest 2. Grant/Research Support (External) 3. Salary/Employment/Royalty(ies)/Honoraria 4. Consultant/consulting fees/other remuneration 5. Speakers' bureau	6. Non-remunerative positions of influence such as officer, board member, trustee, or public spokesperson (All Committee Members Below are on ACMG Committees –Members with other affiliations are listed) 7. Receipt of intellectual property 8. Other

Georgianne L. Arnold, MD, FACMG - Horizon, 2; Recordati, 2; Biomarin, 2; Actelion, 2; SIMD, 6; ACGME, 6; AAP, 6; ASHG, 6 (PC)
Karen W. Gripp, MD, FACMG – Wiley Publishing Inc., 3; FDNA, 4; Novartis, 4 (PC)
Fuki M. Hisama, MD, FACMG – Horizon Pharmaceuticals, 4; ABMGG, 6 (PC)
Christine A. Curtis, PhD, FACMG - CSI Laboratories, 3 (EC)
Thomas E. Mullen, PhD, MS, FACMG - Good Start Genetics Inc., 3 (EC)
Christian P. Schaaf, MD, PhD, FACMG - Springer Publishing Company, 3 (PC), (EC)
Katrina M. Dipple, MD, PhD, FACMG – ACGME, 6; AAP, 6; ASHG, 6; LA BioMed DSMB, 4; SIMD 6 (PC)

Following is a list of committee, education members and staff who have no relationships to disclose:

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SPEAKERS AND MODERATORS

As a sponsor accredited by the ACCME, the American College of Medical Genetics and Genomics must ensure balance, independence, objectivity and scientific rigor in all its sponsored educational activities. All faculty participating in a CME-certified activity are expected to disclose to the audience any relevant financial interest(s) or other relationship(s) with the manufacturer(s) of any commercial product(s), provider(s) of commercial services or any commercial supporters, including diagnostic laboratories, of the activity discussed in an educational presentation. Relevant financial interest(s) or other relationship(s) can include such things as grants or research support, consultancy, major stock holder, etc. The intent of this disclosure is not to prevent a planner or speaker with a relevant financial or other relationship from course planning or making a presentation, but rather to provide learners with information on which they can make their own judgments. It remains for the audience to determine whether the speaker's interests or relationships may influence the presentation with regard to exposition or conclusion. All conflicts of interests have been reviewed and resolved by the education and CME subcommittee.

Moderator: Rizwan Hamid, MD., Ph.D, FACMG, FAAP
Professor and Director, Division of Medical Genetics, Department of Pediatrics, Vanderbilt University School of Medicine., Vanderbilt University Medical Center
No financial relationships to disclose.

I am board certified in Pediatrics, Clinical Genetics and Medical Biochemical Genetics and as such treat children and adults with complicated genetic and metabolic disorders in the Vanderbilt associated Childrens, Adults and the VA hospitals. The research focus of my laboratory is to understand the person-to-person variation in complex human disease, that is, why a gene mutation causes disease in one individual and not another or why are there differences in disease severity amongst individuals. We believe that the answers to these fundamental genetic questions are likely to provide clues to better diagnosis and treatment of a number of human diseases. I am part of the Pulmonary Hypertension Center at Vanderbilt and founding member of the Pediatric Pulmonary Hypertension program. My research is funded by NIH, American Cancer Society and Industry. I am also the PI of the NIH Undiagnosed Disease

Network (UDN) site at Vanderbilt in addition to being the site designated Master Clinician. There are 7 UDN sites in USA. The goal of the program is to help diagnose previously undiagnosed disease in patients with complicated medical problems using the current genomic and bioinformatics approaches.

Moderator: Eric Vilain, MD, PhD, FACMG
UCLA, Departments of Human Genetics and Pediatrics
No financial relationships to disclose.

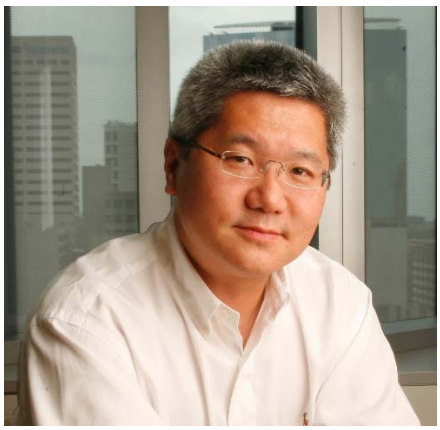
Eric Vilain, M.D., Ph.D., is a professor of Human Genetics, Pediatrics and Urology in the David Geffen School of Medicine at UCLA. He earned his M.D. from the Paris Children's Hospital Necker, his Ph.D. from the Pasteur Institute in Paris, France, then completed a post-doctoral Fellowship in Medical Genetics at the University of California, Los Angeles. He is the Chief of Medical Genetics, the co-director of the Clinical Genomics Center and the Director of the Center for Gender-Based Biology at UCLA. His laboratory explores the genetics of sexual development, focusing on the molecular mechanisms of gonad development, as well as on the genetic determinants of brain sexual differentiation, including sexual orientation and gender identity. He has identified a large number of mutations in sex-determining genes, and developed animal models with atypical sexual development. He has received numerous awards, notably from the National Institute of Health, the March of Dimes, the Doris Duke Charitable Foundation and the Society for Pediatric Research and has published extensively in the field of sexual development. He is a Fellow of the American College of Medical Genetics, a Member of International Olympic Committee on Hyperandrogenism in Athletes and a member of the Board of Scientific Counselors for the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

Speaker: William Gahl, MD PhD, Clinical and Biochemical Genetics
Clinical Director NHGRI, Undiagnosed Diseases Program, Common Fund, NIH; Office of the Clinical Director, NHGRI, NIH
No financial relationships to disclose.

Dr. William A. Gahl earned his B.S. in biology from the Massachusetts Institute of Technology in 1972 and his M.D. and Ph.D. from the University of Wisconsin. He served as pediatric resident and chief resident at the University of Wisconsin hospitals from 1976-80. In 1984, he completed clinical genetics and clinical biochemical genetics fellowships at the NIH's Interinstitute Medical Genetics Training Program, which he directed from 1989 to 1994. Dr.

Gahl elucidated the basic defects in cystinosis and Salla disease and helped bring cysteamine to new drug approval by the Food and Drug Administration as the treatment for cystinosis. His group described the natural history of Lowe syndrome, alkaptonuria, autosomal recessive polycystic kidney disease, Chediak-Higashi disease, GNE myopathy, and Hermansky-Pudlak syndrome (HPS), and his lab discovered the genetic bases of gray platelet syndrome, Hartnup disease, arterial calcification due to deficiency of CD73, 3-methylglutaconic aciduria type III, 3 types of HPS, and neutropenia due to VPS45 deficiency. Gahl has published more than 380 peer-reviewed papers and trained over 40 biochemical geneticists. He established American Board of Medical Specialties certification for medical biochemical genetics. He served on the board of directors of the ABMG and American Society of Human Genetics, as president of the Society for Inherited Metabolic Disorders, and was elected to the American Society for Clinical Investigation and the Association of American Physicians. Dr. Gahl received the Dr. Nathan Davis Award for Outstanding Government Service from the AMA, the Service to America Medal in Science and the Environment, the RareVoice Award for a Government Agency Leader, and numerous other awards.

Speaker: Brendan Lee, MD, PhD, FACMG, FAAP
Professor, Baylor College of Medicine
Financial Relationships to disclose: (Self): The Department of Molecular and Human Genetics receives support from Baylor Genetics Laboratories a joint venture of Baylor College of Medicine and Miraca Holdings



Dr. Lee is the Robert and Janice McNair Endowed Chair in Molecular and Human Genetics, Professor and Chairman of the Department of Molecular and Human Genetics at Baylor College of Medicine. Dr. Lee co-directs the joint MD Anderson Cancer Center, University of Texas, and Baylor College of Medicine Rolanette and Berdon Lawrence Bone Disease Program of Texas, and the Baylor College of Medicine Center for Skeletal Medicine and Biology. He is Founder and Director of the Skeletal Dysplasia Clinic at Texas Children's Hospital, and of the Medical Student Research Track at Baylor. As a pediatrician and geneticist, Dr. Lee studies structural birth defects and inborn errors of metabolism. Dr. Lee identified the first genetic causes of human skeletal dysplasias that affect the growth and strength of the skeleton. He has discovered new causes of brittle bone disease in children. In so doing, he has identified key regulators of bone mass and quality which has led to new approaches for diagnosing and treating these disorders. In the area of metabolic disease, he is has developed new treatments for maple syrup urine disease and urea cycle disorders that are identified at birth by comprehensive newborn screening. Dr. Lee has received local and national recognition including election to the National Academy of Medicine, as Fellow of the American Association for the Advancement of Science, the Texas Academy of Medicine, Engineering, Science, and Technology, the Association of American Physicians, the American Society for Clinical Investigation, and the Society of Pediatric Research (SPR). He has also been awarded the American Society of Human Genetic Curt Stern Award for Outstanding Scientific Achievement, the TAMEST Peter and Edith O'Donnell Award in Medicine, the SPR E. Meade Johnson Award for Pediatrics Research, the Michael E. DeBakey Excellence in Research Award, and the American Philosophical Society's Judson Darland Prize for Patient-Oriented Clinical Investigation.

Speaker: David Goldstein, PhD
Professor of Genetics and Development, Columbia University
Financial Relationships to disclose: (Self) Founding Scientist in precision medicine biotech companies Pairnomix and Praxis, Advisor to AstraZeneca, Janssen.

David Benjamin Goldstein I am the John E. Borne Professor of Genetics and Development and the Director of the Institute for Genomic Medicine (IGM) at Columbia University Medical Center. I was trained in theoretical population genetics and have studied many aspects of human genetic variation over the last 20 years with a particular focus on the genetics of disease and treatment response. Prior to joining CUMC, I was the Richard and Pat Johnson Distinguished University Professor at Duke University and Director of the Center for Human Genome Variation (CHGV). Under my leadership, the CHGV emerged as a leading human genetics research center with a number of seminal discoveries, including de novo mutations in ATP1A3, the gene responsible for Alternating Hemiplegia of Childhood, the role of IL28B in treatment response to Hepatitis C infection, and was a leader in the field of demonstrating the potential of next generation sequencing in diagnosing rare genetic and neurological conditions. I am principal investigator of Epi4K, the NINDS Epilepsy Genetics Center without Walls and currently direct its genome sequencing and bioinformatics core. Epi4K is currently the largest epilepsy genetics project in the world and is in the process of generating whole exome and whole genome sequence data on no less than 4,000 patients with epilepsy. At the IGM I have been responsible for establishing a group of Precision Medicine Initiatives in partnership with New York Presbyterian Hospital and in collaboration with key faculty and physicians at CUMC. These initiatives enroll thousands of patients annually in the areas of epilepsy, maternal fetal medicine, kidney and liver disease, ALS and undiagnosed childhood disease and their design success is the basis for the NYC PMI's planned approach to enrollment in this application. Together with Dr. Mark Rubin I will act as the Co-Program Director of the NYC Precision Medicine Initiative.

Speaker: Liz Worthey, PhD
Faculty Investigator, HudsonAlpha Institute for Biotechnology
Financial Relationships to disclose: (Self) Founder and CEO of Envision Genomics

Dr. Liz Worthey has degrees in Immunology, Genomics, and Genetics and has studied at leading Universities including Glasgow, Birmingham, Oxford, and Stanford Universities, Imperial College London, and the University of Washington. She has more than 20 years of experience in the development and application of tools, methods, and algorithms to extract knowledge from large genomics and other research and clinical datasets. Dr. Worthey performed the first analyses that successfully used genomic data to change medical treatment and together with colleagues built the first Genomic Medicine program in the world. She has been invited to give talks around the world on this topic. At HudsonAlpha she is the head of the Software Development and Informatics (SDI) Group.

Participation Instructions

1. Participant logs into ondemand.acmg.net
2. Once logged in the participant will access the session they would like to view. They will be asked if they would like to claim credit for the meeting, or if they will not claim credit for the meeting. Then, this information (Course description) will appear, and participant will have to attest that they have read the information. They will then click Continue.
3. After that, the participant will be able to select the credit types to claim.
4. For each session with a post-test, the participant will need to mark and complete the matching pre-test.
5. Then the participant will watch the session presentations.
6. Participant will complete viewing all session content. "Check marks" indicate which presentations have been viewed.
7. After viewing all presentations within a session, participant will click the "Claim Credit for Session" button under the CME dropdown at the top of the page.
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9. Participant will continue the steps above to earn credits for additional sessions.
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11. To print their certificate, the participant will click the "Print Certificate" button under the CME dropdown at the top of the page. Participant must complete the meeting evaluation (one time only) before they can access their certificate. Participant will then choose their certificate(s). The certificate(s) will be automatically updated as they earn new credits.

Stream Requirements	
Network	For best results, use a hardwired network connection instead of wireless
Full Screen Viewing	If you would like to view the webcast full screen, display the tool bar at the bottom and click the double arrow in the far right corner. The screen will enlarge to the full screen of you system. To restore the size, press the "ESC" key
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For Technical Support call	1-800-504-5379

Mobile Viewing Requirements	
Android Devices	Android 2.3+ with Adobe Flash Player 10.2 or better installed Install Flash Player
Apple Devices	iOS 4+

Online Viewing Requirements	
Bandwidth	512kbps

Required Hardware and Software	Screen resolution of 1024X768 or larger Sound card and speakers/headphones
Browser	Microsoft Internet Explorer 7.0 or better Mozilla Firefox 4 or better Safari 5 or better
Windows	Operating System: Windows 8 desktop mode, Windows 7; Windows Vista; Windows XP Service Pack 2 or 3 x86 or x64 (Browsers must be in 32-bit mode) 1.6-gigahertz (GHz) or higher processor 512MB of RAM
Mac OS	Operating System: Apple Mac OS X 10.4.8 or above Intel Core™ Duo 1.83GHz or faster processor 512MB of RAM

Registration and Fees

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ACMG Members and ACMG Trainees: ($50)
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