



2nd Machine Learning Vulnerable Patient Symposium

Focused on Developing an

Artificial Intelligence-based Forecast System for Short-Term CVD Events

A Satellite Event in Conjunction with
2017 Annual Scientific Sessions of American Heart
Association



Hilton Anaheim
(adjacent to the convention center)
777 Convention Way Anaheim

November 13, 7-10 PM

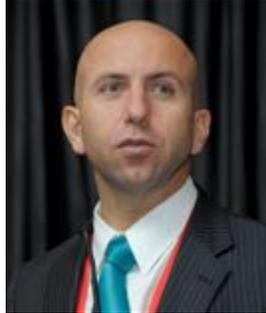
This event is open to public. Participation via GoToMeeting can be requested. Dinner will be served 7:30 PM.

This is the 22nd SHAPE Symposium held since 2001 focusing on Vulnerable Plaque & Vulnerable Patient.

Agenda

7:00 – 7:30 PM

Welcome



Morteza Naghavi, M.D.

Founder of SHAPE and Executive Chairman of the SHAPE Task Force

Opening Remarks



Valentin Fuster, M.D., Ph.D.

Professor of Medicine and Physician-in-Chief, Mount Sinai Hospital and Icahn School of Medicine, New York, NY

Moderators:



Matthew Budoff, M.D.
Professor of Medicine, UCLA
Endowed Chair of Preventive Cardiology,
Los Angeles Biomedical Research
Institute

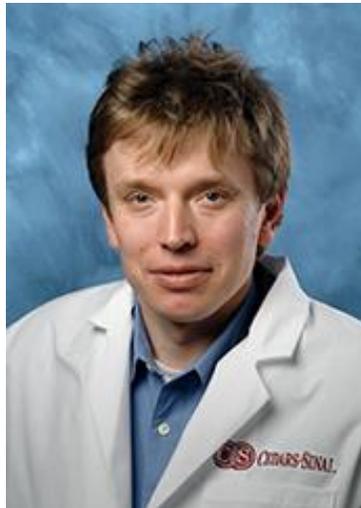


Daniel Berman, M.D.
Chief of Cardiac Imaging and Nuclear
Cardiology at the Cedars-Sinai Heart
Institute Professor of Medicine at the
David Geffen School of Medicine UCLA

7:30 – 7:50 PM
Featured Speakers:

Machine Learning in Cardiac Imaging

Machine learning improves image analysis, diagnosis and prognostic risk assessment in cardiac imaging.



Piotr Slomka, Ph.D.
Chief Scientist, Artificial Intelligence in Medicine Program, Department of Imaging Cedars-Sinai
Medical Center, Professor, UCLA School of Medicine, Los Angeles

7:50 – 8:10 PM

Featured AHA 2017 Machine Learning Presentation:

Machine Learning Outperformed ACC/AHA Pooled Cohort Equations Risk Calculator for Detection of High-Risk Asymptomatic Individuals and Recommending Treatment for Prevention of Cardiovascular Events in the Multi-Ethnic Study of Atherosclerosis (MESA)



Albert Yen, M.D. on behalf of co-investigators:

Ioannis A. Kakadiaris, Ph.D.¹, Michalis Vrigkas, Ph.D.¹, Matthew Budoff, M.D.², Albert A. Yen, M.D.³, Morteza Naghavi, M.D.⁴

1: Computational Biomedicine Lab, University of Houston, Houston, TX, USA; 2: Division of Cardiology, Los Angeles Biomedical Research at Harbor-UCLA Medical Center, Torrance, CA, USA; 3: MEDITEX (Medical Innovations in Texas), Houston, TX, USA; 4: Society for Heart Attack Prevention and Eradication, Houston, TX, USA

8:30-8:50 PM

The Precision Medicine Initiative (PMI): The largest NIH funded Study

Will PMI find the biomarkers of short-term CVD events and how long might it take?



Philip Greenland, M.D.

Professor of Cardiology and Professor of Preventive Medicine at Northwestern University's Feinberg School of Medicine, Chicago, IL

8:50-9:10 PM

**New Insights into Triggers of MI and CVD Events
The Straw that Breaks Camel's Back**



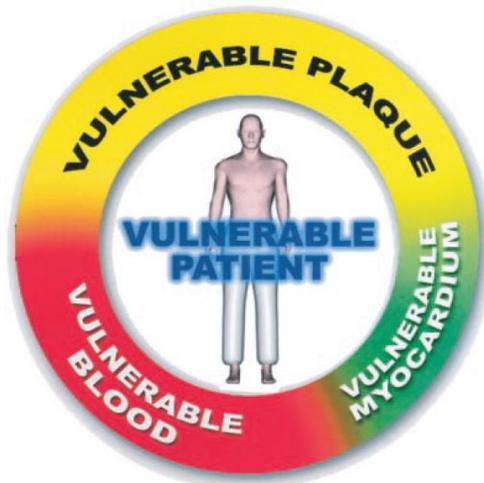
Robert Kloner, M.D., Ph.D.

Professor of Medicine, and Director of Cardiovascular Research at Huntington Medical Research Institutes in Pasadena, CA

9:10-1:00 PM

Discussions by Panel of Speakers and Invited Guest Faculty Focused on SHAPE's Project:
"Machine Learning Vulnerable Patient"

What does the final result look like? A single serum biomarker like PSA, a panel of serum biomarkers, an imaging biomarker like mammography, or a machine algorithm combining all basic information about risk factors, and plaque, blood, myocardium vulnerability?



Background: Imagine instead of the existing daily weather forecasts and hurricane alerts we were told the probability of a storm within the next 10 years! This is how heart attacks are predicted today. We teach our physicians to calculate the 10-year probability of a heart attack and sudden cardiac death based on their patients' risk factors. Long term predictions do not trigger immediate preventive actions. Although some people develop warning symptoms, half of men and two-thirds of women who die suddenly of coronary heart disease (CHD) have no previous symptoms. Imagine if we could alert people months, weeks, or even days before a heart attack and trigger immediate preventive actions.

The Idea: Use machine learning to create new algorithms to detect who will experience a CHD event within a year (**The Vulnerable Patient**). Algorithms will be based on banked biospecimen and information collected days up to 12 months prior to the event. We will utilize existing cohorts such as MESA, Heinz Nixdorf Recall Study, Framingham Heart Study, BioImage Study and the Dallas Heart Study. External validation to test for discrimination and calibration will be conducted using other longitudinal observational studies that provide adjudicated cardiovascular event information such as the MiHeart, JHS, DANRISK and ROBINSCA. Additionally, we will use machine learning to characterize individuals who, despite high conventional risk, have lived over 80 years with no CHD events (**The Invulnerable**). We expect to discover new targets for drug and possibly vaccine development. We will make the algorithms available as an open source tool to collect additional data over time and increase its predictive value.

Major Longitudinal Cohort Studies	
Invited Investigators	Cohorts
Dan Levy	Framingham Heart Study
Matt Budoff & Michael Blaha	MESA
Raimun Erbel	HNR (Heinz Nixdorf Recall Study)
Valentin Fuster	PESA/BioImage / HRP Study
Amit Khera	Dallas Heart Study
Adolfo Correa & Herman Taylor	Jackson Heart Study
Tatiana Kouznetsova	FLEMENGHO Study
Khurram Nasir	MiHeart Study
Harry de Koning & Matthijs Oudkerk	ROBINSCA
Jes Sanddal Lindholt	VIVA
Michael Blaha & Marcio Bittencourt	Brazilian MESA / ELSA
Axel Diederichsen	DANRISK and DANCAVAS
Oscar Franco	Rotterdam Heart and Erasmus Age
Paul Elliot	UK Biobank
Ken Mahaffey	TRACER
Robert Harrington	PLATO
Wolfgang Koenig & Kari Kuulasmaa	BiomarCaRE

Invited Key Opinion Leaders (Alphabetic Order)



Arthur Agatston, M.D.

Founder of South Beach Diet, Director of Wellness at Baptist Hospital and Professor of Medicine at University of Miami, FL



Juan Badimon, Ph.D.

Professor of Medicine, Director, Atherothrombosis Research Unit, Mount Sinai Hospital, New York, NY



Sameer Bansilal, M.D.

Assistant Professor Medicine, Cardiology, Mount Sinai Hospital, New York, NY



Marcio Bittencourt, M.D., Ph.D., M.P.H.,

Professor of Medicine, University of São Paulo, São Paulo, Brazil



Michael Blaha, M.D., M.P.H.,
Director of Clinical Research, Ciccarone Center for the Prevention of Heart Disease, Johns Hopkins University,
Baltimore, MD



Adolfo Correa, M.D., Ph.D.
Chief Science Officer, Jackson Heart Study, Professor of Medicine and Pediatrics, University of Mississippi,
Jackson, MS



Rahul Deo, M.D., Ph.D.
Assistant Professor of Medicine, Division of Cardiology, University of California, San Francisco, CA

Axel C. P. Diederichsen, M.D.
Associate Professor, Department of Cardiology, Odense University Hospital, Denmark



Raimund Erbel, M.D.
Professor of Medicine, Chief of Cardiology and Director of West German Heart Centre, University Essen, Germany



Erling Falk, M.D., Ph.D.

Professor of Pathology and Cardiology, Aarhus University Hospital (Skejby), Aarhus, Denmark



Sergio Fazio, M.D., Ph.D.

Chair of Preventive Cardiology and Professor of Medicine, Oregon Health and Science University, Portland, OR



Zahi Fayad, M.D.

Professor of Radiology and Medicine (Cardiology), Director of the Translational and Molecular Imaging Institute, Mount Sinai Hospital, New York, NY



Steve Feinstein, M.D.

Professor, Cardiovascular Disease, Internal Medicine, Rush University Medical Center, Chicago, IL



Oscar Franco, M.D., Ph.D.

of Preventive Medicine, PI Cardiovascular Epidemiology Group, Director of ErasmusAGE, Erasmus Medical Center, Rotterdam, Netherlands



Khawar Gul, M.D.

Consultant Cardiologist, SHAPE Volunteer, Lompoc Valley Medical Center, Lompoc, CA



Craig J. Hartley, Ph.D.

Professor Emeritus - Cardiovascular Sciences and Bioengineering, Baylor College of Medicine, Houston, TX



Robert Harrington, M.D.

Chair of the Department of Medicine, Professor of Medicine, Stanford University School of Medicine, Stanford, CA



Harvey Hecht, M.D.,

Director of Cardiac CT Imaging Laboratory, Mount Sinai School of Medicine, New York, NY



Howard Hodis, M.D.

Director of Atherosclerosis Research, Keck School of Medicine USC, Los Angeles, CA



Borja Ibáñez, M.D., Ph.D.

Professor, Spanish National Center for Cardiovascular Research (CNIC) & Cardiologist, Hospital Clinico San Carlos, Madrid, Spain



Ioannis Kakadiaris, Ph.D.

Professor of Computer Science and Biomedical Engineering, University of Houston, Houston, TX



Amit Khera, M.D.

Associate Professor and Director, Preventive Cardiology Program, UT Southwestern Medical Center, Dallas, TX



Stanley Kleis, Ph.D.

Professor of Mechanical Engineering and Biomedical Engineering, University of Houston, Houston, TX



Wolfgang Koenig, M.D., Ph.D.,

Professor of Medicine (Cardiology), University of Ulm Medical School, Ulm, Germany



Harry de Koning, M.D., Ph.D.

Professor of Screening Evaluation, School of Public Health, Erasmus MC, Rotterdam, Rotterdam, Netherlands



Tatiana Kuznetsova, M.D.

Professor and Director, Hypertension and Cardiovascular Epidemiology, University of Leuven, Leuven, Belgium



Daniel Levy, M.D.

Director of Framingham Heart Study, and Intramural Investigator, National Institute of Health, Bethesda, MD



Amir-Abbas Mahabadi, M.D.

Assistant Professor of Cardiology, West German Heart Centre, University Essen, Germany



Ken Mahaffey, M.D.

Professor of Medicine (Cardiovascular Medicine), Stanford University Medical Center, Stanford, CA



David Maron, M.D.

Professor and Director, Preventive Cardiology, Stanford University School of Medicine, Stanford, CA



Roxana Mehran, M.D.

Professor of Medicine and Director of Interventional Clinical Trials, Mount Sinai School of Medicine, New York, NY



Ralph Metcalfe, Ph.D.

Professor of Mechanical and Biomedical Engineering, University of Houston, Houston, TX



Susanne Moebus, Ph.D., M.P.H.

Biologist & Epidemiologist, Head of the Centre for Urban Epidemiology, University Essen, Germany



Martin Mortensen, M.D., Ph.D.

Assistant Professor of Cardiology, Aarhus University Hospital, Aarhus, Denmark



James Muller, M.D.

Former Professor at Harvard Medical School and Massachusetts General Hospital, Boston, MA



Tasneem Z. Naqvi, M.D.

Professor of Medicine and Director of Echocardiography, College of Medicine, May Clinic, Scottsdale, AZ



Jagat Narula, M.D., Ph.D.

Associate Dean for Global Affairs, Professor of Medicine (Cardiology), Mount Sinai Hospital and School of Medicine, New York, NY



Khurram Nasir, M.D., M.P.H.

Director, High-risk Cardiovascular Disease Clinic, Baptist Health South Florida, Miami, Florida



Christopher J. O'Donnell, M.D., M.P.H.

Chief, Cardiovascular Epidemiology and Human Genomics Branch, NHLBI Division of Intramural Research, Bethesda, MD



Matthijs Oudkerk, M.D.

Faculty of Medical Sciences, University of Groningen, Groningen, Netherlands



Paolo Raggi, M.D.

Director, Mazankowski Alberta Heart Institute, Professor of Medicine, University of Alberta, Edmonton, AB, Canada



James HF Rudd, Ph.D.

Senior Lecturer, Division of Cardiovascular Medicine, University of Cambridge Hospital, Cambridge, UK



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Professor and Head of Dept. of Vascular Surgery, Rigs Hospitalet, University of Copenhagen, Copenhagen, Denmark



Robert Superko, M.D.

Professor of Medicine and President at Cholesterol, Genetics, and Heart Disease Institute, Carmel, CA



Brenda Garrett Superko, C.V.R.N.

Board Member of SHAPE. Assistant Director Cholesterol, Genetics, and Heart Disease Institute, Carmel, CA



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Herman A. Taylor, M.D., M.P.H.

Director, Cardiovascular Research Institute, Morehouse School of Medicine, Atlanta, GA



Pierre-Jean Touboul, M.D.

Professor of Neurology, Department of Neurology and Stroke Center, AP-HP Bichat University Hospital,
Neurology and Stroke Center, Paris, France



Thomas J. Wang, M.D.

Director of Cardiovascular Medicine, and Physician-in-Chief, Vanderbilt Heart Institute, Nashville, TN



Nathan Wong, M.P.H., Ph.D.

Professor of Epidemiology and Director, Heart Disease Prevention Program, University of California, Irvine, CA