Multiple sclerosis (MS) is a complex disease in which genetic, environmental and stochastic factors all play a part to induce aberrant interactions between the immune system and neural cells, ultimately transforming into progressive neurological disability. Our understanding of MS is rapidly evolving and multiple areas of research are showing great promise of future treatment or cure. However, further progress will depend on establishing a deep understanding of the underlying disease mechanisms. With this in mind, this conference aims to:

> Define integrated approaches by which to study disease pathogenesis, which represents a critical barrier to progress in the field;
> Provide an up-to-date perspective on molecular pathogenesis and how this might be used to optimize patient management;
> Define state-of-the-art technologies with which to quantify disease burden;
> Discuss key elements concerning the concept of disease heterogeneity and how emergent approaches to disease stratification can optimize management strategies; and
> Provide perspectives concerning the potential therapeutic applications of neuroprotective, regenerative and bioengineering-based strategies, and how these might complement immunotherapy.

Participants should gain an understanding of how a systems biology-based approach can accelerate our knowledge base of MS and how that knowledge base can be successfully applied to novel clinical research and development, as well as potentiated patient care.

**Session Topics:**

> Nature and Nurture: Insights Beyond GWAS and Epidemiological Studies
> Cellular and Molecular Profiling: The Road to an Integrated Approach
> Paraclinical Measures of Structural and Functional Change
> Immunopathogenesis
> Clinical Controversies
> Clinical Developments
> Neurobiology
> Repair

**Abstract & Scholarship Deadline:** September 12, 2012
**Late-Breaking Abstract Deadline:** October 11, 2012
**Early Registration Deadline:** November 12, 2012

Note: Scholarships are available to students and postdoctoral fellows and require a brief application and submission of an abstract. Short talk speakers will also be selected from abstracts. Early registration saves US$150 on later fee. Information shown is subject to possible change. Please visit meeting website for the most up-to-date program information.
FRIDAY, JANUARY 11
Arrival and Registration

SATURDAY, JANUARY 12
Welcome and Keynote Address
*Trevor J. Kilpatrick, University of Melbourne, Australia
Lawrence Steinman, Stanford University, USA
When Bad is Good: Amyloid Molecules as Guardians of the Brain. An Unexpected Role of Amyloidogenic Molecules in Multiple Sclerosis and Ischemic Diseases: aB Crystalline, Amyloid-beta, tau, Prion Protein and other Amyloids

Nature and Nurture: Insights Beyond GWAS and Epidemiological Studies
Patrizia Casaccia, Advanced Science Research Center, USA
Genome-Wide Study of DNA Methylation Reveals Epigenetic Alterations in Normal Appearing White Matter of MS Brains
Justin P. Rubio, GlaxoSmithKline R&D, UK
Realizing the Promise of Pharmacogenomics
Tomas Olsson, Karolinska Institutet, Sweden
Genes and Lifestyle/Environmental Factors in Multiple Sclerosis
Judith Field, University of Melbourne, Australia
Short Talk: Gene Expression in Immune Cell Subsets: A Risk Gene Study for Multiple Sclerosis

Cellular and Molecular Profiling: The Road to an Integrated Approach
*Hartmut Wekerle, Max Planck Institute, Germany
From Gut to Brain: The Complex Build-Up of Experimental Autoimmune Encephalomyelitis
William H. Robinson, Stanford University School of Medicine, USA
From Tissue to Proteomics and Lipidomics
Ronald N. Germain, NIH, USA
From Tissue to Proteomics and Lipidomics

Poster Session 1

SUNDAY, JANUARY 13
Paraclinical Measures of Structural and Functional Change
*Catherine Lubetzki, INSERM and University Pierre et Marie Curie (UPMC), France
Elliott M. Frohman, University of Texas Southwestern Medical Center, USA
Eye-ing a Window of Neuroprotection in the Visual System for MS
John C. Gore, Vanderbilt University, USA
Recent Developments in MRI

Adrienne N. Dula, Vanderbilt University, USA
Short Talk: Molecular MRI of Multiple Sclerosis Using 7 Tesla Chemical Exchange Saturation Transfer (CEST)
Paul M. Matthews, Imperial College London, UK
Short Talk: Towards Imaging Dynamics of the Innate Immune Response in Multiple Sclerosis
Frauke Zipp, Johannes-Gutenberg-Universität Mainz, Germany
Crosstalk of the Immune and Nervous Systems
Martin Kerschensteiner, Ludwig Maximilians University Munich, Germany
Harnessing the Potential of Cellular and Molecular in vivo Imaging Techniques

Immunopathogenesis
*Lawrence Steinman, Stanford University, USA
Stephen M. Anderton, University of Edinburgh, UK
Immune-Mediated Autoaggression and Regulation
Takashi Yamamura, National Institute of Neuroscience, NCP, Japan
Integrating Innate Immunity and Key Environmental Interactions
Bahareh Ajami, Stanford University School of Medicine, USA
Short Talk: Pathological Differences in Th1 and Th17 Mediated Experimental Autoimmune Encephalomyelitis (EAE)
Stephen D. Miller, Northwestern University Medical School, USA
Tolerance Induction Using Myeline Peptide Coupled Apoptotic Cells and Biodegradable Nanparticles for MS Therapy

Poster Session 2

MONDAY, JANUARY 14
Clinical Controversies
Helen Tremlett, University of British Columbia, Canada
Disease Heterogeneity: Emerging Concepts in MS
Jun-ichi Kira, Kyushu University, Japan
Cutting Edges of Multiple Sclerosis and Neuromyelitis Optica
*Brenda Banwell, University of Pennsylvania, USA
Negotiating Between ADEM, CIS and MS: An Age-Specific Roadmap
Judith M. Greer, University of Queenland, Australia
Short Talk: HLA Alleles Play a Role in Determining the Disease Course and Distribution of Lesions in MS
Timothy Coetzee, National Multiple Sclerosis Society, USA
CCSvI – Lessons for Funders and the Research Community

Clinical Developments
Richard K. Burt, Northwestern University, USA
Hematopoietic Stem Cell Transplantation for Multiple Sclerosis
*Richard A. Rudick, Cleveland Clinic Foundation, USA
Design Issues for Clinical Trials in Progressive MS
Paul M. Matthews, Imperial College London, UK
Treatment Stratification for MS: Opportunities and Challenges
Zongqi Xia, University of Pittsburgh, USA
Short Talk: Leveraging Electronic Health Records for Research in Multiple Sclerosis

* Session Chair † invited but not yet accepted  Program current as of May 23, 2019. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/13A1.
Poster Session 3

TUESDAY, JANUARY 15

Neurobiology

Peter K. Stys, University of Calgary, Canada
Axon-Glial Interactions in MS and AD

*Trevor J. Kilpatrick, University of Melbourne, Australia
Targeting the Oligodendrocyte Lineage in Demyelinating Disease

Patrick Kuery, University of Duesseldorf, Germany
Short Talk: Nucleocytoplasmic Translocation of p57kip2 Promotes Oligodendroglial Differentiation

Hedwic F. Kuipers, Stanford University, USA
Short Talk: Differential Roles for the Small Heat Shock Protein Alpha B-Crystallin in Cuprizone-Induced De- and Remyelination

Catherine Lubetzki, INSERM and University Pierre et Marie Curie (UPMC), France
Remyelination in MS: The New Frontier?

Peter I. Jukkola, Ohio State University, USA
Short Talk: K+ Channel Alterations in the Progression of Experimental Autoimmune Encephalomyelitis

Cellular Dynamics Underpinning Pathogenesis and Repair

*Amit Bar-Or, University of Pennsylvania, USA
Immune:Glial Interactions in MS: Implications during CNS Injury and Repair

Shannon Dunn, University of Maryland, Baltimore, USA
Sex Differences in Multiple Sclerosis: Role for Male and Female Pubertal Factors

Gianvito Martino, San Raffaele Scientific Institute, Italy
The Role of Neural Stem Cells in Brain Regeneration: Where we are and Where we go in Multiple Sclerosis

WEDNESDAY, JANUARY 16

Departure