

Problems in the Biology of Complex Diseases

(CMM, MCB, GENE, IMB, PCOL 595H)

Friday, 9-10.50 am AZ time – Live Online

<https://arizona.zoom.us/j/81344095206>

Human complex diseases (CD) such as asthma, cancer, cardiovascular and neurodegenerative diseases, are major biomedical challenges, because they are common but difficult to decipher. The complexity of these diseases is reflected by their phenotypic heterogeneity and likely results from intricate interactions among genetic, environmental and developmental factors that modify disease susceptibility and severity. Understanding complex diseases is urgent, because these conditions impose a burden on our society. Yet, this goal cannot be achieved by isolated research disciplines. Rather, it requires a novel paradigm that successfully integrates basic and clinical research across multiple fields and translates mechanisms into phenotypes and phenotypes into treatments. This novel paradigm provides the underpinning for this Colloquium.

The Colloquium features speakers who are nationally and internationally renowned for their work on environmental biology, immunological and clinical phenotyping, microbiome, developmental biology, epigenetics, genetic epidemiology, population genetics, functional genomics of human and animal models. The theme and vision of the Colloquium are unique in that *the discussion focuses particularly on the biological components shared by ostensibly distinct complex diseases (for instance, asthma, neurodegenerative and cardiovascular diseases)*. The underlying assumption, supported by much emerging evidence, is that these shared components are features that define the mechanistic architecture of complex diseases as a group. The goal of the Colloquium is to provide a platform that will catalyze broad, expert discussions on these foundational topics, thereby fostering the emergence of a new experimental and conceptual paradigm in complex disease biology.

By the way, over half of the speakers featured in our 2022 Colloquium come from top-rated national and international institutions and are driving their fields. Thus, albeit virtual, the 2022 Colloquium will definitely be exciting.

WHEN	WHO	WHAT (*final title)
Jan 14	Donata Vercelli (UA)	Introduction and Overview
Jan 21	Debbie Meyers (UA)	So You Had Your Genome Sequenced, What Did You Learn?*
Jan 28	Eugene Bleeker (UA)	Precision Medicine
Feb 4	Carole Ober (U. Chicago)	Revealing Polygenic Pleiotropy Using Genetic Risk Scores for Asthma*
Feb 11	Marcelo Nobrega (U. Chicago)	Regulatory Variants and the Genetic Architecture of Complex Traits*
Feb 18	Dean Billheimer (UA)	To P or not to P?*
Feb 25	Anthony Bosco (Perth, AUS/UA)	Systems Biology Approaches towards Asthma Prevention*
Mar 4	Erika von Mutius (Helmholtz/U. Munich)	The role of the environment in asthma pathogenesis
Mar 11	Spring Break	No classes
Mar 18	Donata Vercelli (UA)	Interactive Q/A
Mar 25	Greg Caporaso (NAU)	Toward Cancer Microbiome Multi-Omics Analysis with QIIME 2*
Apr 1	Jack Gilbert (UC San Diego)	The Microbiome in the Built Environment*
Apr 8	Talal Chatila (Harvard Medical School)	Immune regulation in complex lung disease pathogenesis
Apr 15	Susan Lynch (UC San Francisco)	Mining the Human Microbiome for Pathogenic Mechanisms and Novel Therapies*
Apr 22	Darren Cusanovich (UA)	The Single Cell Perspective on Complex Diseases*
Apr 29	Donata Vercelli (UA)	Interactive/Q&A and wrap-up