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ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

ΣΕΜΙΝΑΡΙΟ ΙΤΕ/ΙΕΧΜΗ & Π.Π./Τμ. ΧΗΜΙΚΩΝ ΜΗΧΑΝΙΚΩΝ

ΟΜΙΛΗΤΗΣ: **Athanasios Nenes**
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ΘΕΜΑ: **Understanding the impacts of human activities on atmospheric particles, clouds, storms and climate**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΙΤΕ/ΙΕΧΜΗ

ΗΜΕΡΟΜΗΝΙΑ: **Τρίτη, 15 Δεκεμβρίου 2015**

ΩΡΑ: **12:30**

Abstract: The effect of human activities on climate is a grand challenge facing society today. Humans influence climate in many ways. Emissions of greenhouse gases (GHGs) tend to warm climate, by reducing the amount of infrared radiation that is emitted to space. Increased levels of suspended atmospheric particles ("aerosols") exert a net cooling effect by directly scattering and absorbing of incoming solar radiation. Aerosols also affect clouds by acting as the seed for droplet (or ice crystal) formation. "Seeding" of clouds by anthropogenic pollution is thought to cool climate by modulating cloud reflectivity and development. Aerosol variations have also been proposed to affect the development of storm systems, precipitation and the hydrological cycle overall. Quantitatively constraining aerosol impacts on clouds and climate however is very uncertain and significantly affects predictions of climate sensitivity to GHG levels. The large uncertainty originates largely from the complex and multi-scale coupling of aerosols and clouds. Added to this complexity is the large variability and range of aerosol types, each of which is characterized with its own ability to nucleate droplets and ice crystals.

This talk will present key advancements on the description of aerosol-cloud interactions in climate model frameworks through the combination of observations, theory and modeling. We will first focus on how anthropogenic pollution can synergistically interact with biogenic emissions to form aerosol, then present advancements in the physical representation of droplet and ice formation in models, and demonstrate how instrument development efforts helped solve long-standing issues regarding parametric uncertainty for droplet formation from atmospheric aerosol. We will conclude by presenting work on the importance of aerosol-cloud interactions in storm development, specifically on the role of aerosol in the rapid intensification of tropical cyclones.

Short Bio: Athanasios Nenes is a Professor, Georgia Power Faculty Scholar and Cullen-Peck Fellow in the Schools of Chemical & Biomolecular Engineering and Earth & Atmospheric Sciences at the Georgia Institute of Technology. He is a Visiting Associate in Chemical Engineering at the California Institute of Technology, and an affiliated researcher at the Institute of Chemical Engineering Science (Patras, Greece) and the National Observatory of Athens, Greece. Prof. Nenes received a Diploma in Chemical Engineering, National Technical University of Athens, Greece (1993), M.Sc. in Atmospheric Chemistry, University of Miami (1997) and a Ph.D. in Chemical Engineering, California Institute of Technology (2002). His expertise is on atmospheric particulate matter (aerosol), their impacts on air quality and interactions with clouds and climate. He is an author in more than 195 peer-reviewed manuscripts, and is developer of the ISORROPIA aerosol thermodynamic equilibrium codes, co-inventor of the Continuous Flow Streamwise Thermal Gradient CCN chamber, Scanning Flow CCN Analysis and the Continuous Flow Pressure Gradient CCN chamber. He is currently serving on the National Research Council Committee on the Future of Atmospheric Chemistry Research, Secretary of the Atmospheric Science Section of the American Geophysical Union, the Board of Directors of the American Association for Aerosol Research, and on the Committee on Nucleation and Atmospheric Aerosols. He has received the Robert W. Vaughan Lectureship, California Institute of Technology (2014), Atmospheric Sciences Section Ascent Award, American Geophysical Union (2012), Outstanding Faculty Research Author Award, Georgia Institute of Technology (2012), Kenneth T. Whitby Award, American Association for Aerosol Research (2011), the Henry G. Houghton Award, American Meteorological Society (2009), the Sigma Xi Young Faculty Award, Georgia Institute of Technology (2007), the Sheldon K Friedlander Award by the American Association for Aerosol Research (2005), a NASA New Investigator Award (2004) and a National Science Foundation CAREER Award (2004).