Chair’s Message

Welcome to the new 2014-15 season for the Metro New York – New Jersey ASM International Chapter. We hope the upcoming program offers the membership interesting topics and reasons to come out to our meetings. We urge members to attend, partake of continuing education, and to meet other material scientists in our region. I would like to welcome a new advertiser, MetLab Corporation of Niagara Falls, www.metlabcorp.com

We continue to be a chapter of excellence as part of ASM International, being a 5 star Outstanding Chapter in the large chapter category. This honor continues due to the excellent performance of our past chairman, Prof. Nikhil Gupta of New York University and the entire executive committee and of course, our members.

This past summer, we held another summer Materials Camp at NJIT under the direction of Prof. Roumiana Petrova of NJIT. This has been a continuing activity for Professor Petrova for over 8 years and is aimed at educating High School Science teachers in materials as a way to increase student interest in college years. We are all thankful for her efforts and dedication. Other members of the executive committee took part too.

Our September program, detailed inside, is a new concept. We have invited several students from the local universities to give short talks on their research activities. The idea is to highlight excellent students, but also provide an opportunity to have our membership meet the leading students. We hope potential employment opportunities can be discussed and even summer internships. One challenge facing many materials companies in this region is finding talent, and we hope this can be the start of a new program for our chapter and employers in the region. Students from New Jersey Institute of Technology, Stevens Institute of Technology, and New York University Polytechnic School of Engineering are confirmed to participate.

The meeting location is Mason Madrid, in Palisades Park on September 16th. We hope to see you there.

Our success as a chapter depends on the members, attending technical (Continued on page 4)
Sustaining Members

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The Metro NY-NJ Chapter thanks these companies for their ongoing support.

785th Meeting  September 16, 2014  (Tuesday)

Program:  Place:  
6:15 pm Networking  Members & Guests:  $30.00
7:00 pm Dinner  Free
8:00 pm Presentations

Cost:

Student Research Presentations
Note: Abstracts appear on page 3

Large-Area Patterning of Graphene via Holographic Lithography and Plasma Etching
JunJun Ding, Stevens Institute of Technology

Junjun Ding is a Ph.D candidate in the Department of Mechanical Engineering at Stevens Institute of Technology. He received his B.S and M.S in Mechanical Engineering from University of Science and Technology of China in 2007 and 2010, respectively. His research area is 2D material nanofabrication

Development of Lightweight Functional Composites with a Carbon Nanofiber Reinforcement
Steven E. Zeltmann, NYU Polytechnic School of Engineering

Steven E. Zeltmann is a student in the combined bachelors/masters program in Mechanical Engineering at the NYU Polytechnic School of Engineering. He works as a research assistant at the Composite Materials and Mechanics Laboratory under the guidance of Dr. Nikhil Gupta. His research interests are nanomaterials, composites and lightweight metallic foams.

Plasma Electrolytic Deposition and Process Modeling
Linxin Zhu, NJ Institute of Technology

Linxin Zhu, graduated at Nanjing University of Science and Technology in China, now is a PhD student in Material Science and Engineering in NJIT with Research Advisor Prof. Roumiana Petrova. Linxin is focusing on developing Plasma Electrolytic Deposition technique about its mechanism, optimization of experiment setup, process parameter and its bio application.

(Continued on page 3)
Large-Area Patterning of Graphene via Holographic Lithography and Plasma Etching
Junjun Ding, Stevens Institute of Technology

Abstract:
Large-area patterning of graphene is important for applications such as gas sensors, light harvesting, etc. Here we demonstrate a novel technique to fabricate large-area graphene nanomesh and nanodots using a unique multi-stack processing approach utilizing layers of negative photoresist, anti-reflective coating, positive photoresist, graphene, and Cu foil. To fabricate graphene nanostuctures, a periodic nanopatterned photoresist mask was created using holographic lithography on a graphene layer grown on Cu foil. After etching the unprotected graphene layer using O2 plasma, the remaining photoresist was then lifted off from the graphene layer by removing the positive photoresist layer. A PMMA layer was coated on top of the graphene layer, followed by the etching of Cu. The graphene structure was then transferred onto a SiO2/Si substrate. Combining holographic lithography and O2 plasma etching, we have fabricated a large-area, periodic and flexible graphene nanomesh, whose pore size and neck width were precisely controlled by holographic lithography and O2 plasma etching parameters. This holographic lithography-based patterning technique provides a promising, low-cost manufacturing alternative for large-area, graphene nanostuctures on arbitrary substrates.

Development of Lightweight Functional Composites with a Carbon Nanofiber Reinforcement
Steven E. Zeltmann, NYU Polytechnic

Abstract:
The use of carbon nanofibers (CNF) in polymer composites has been of great interest because of the possibility of increasing mechanical properties while maintaining low density. CNFs also allows for the creation of multifunctional composites with thermal and electrical properties previously unattainable in polymer composites. Because of the small size of individual CNFs, they can be dispersed along with another phases in the matrix to further extend multifunctionality of composites. Syntactic foams are a class of lightweight composites containing hollow particles, typically of microscopic scale, in a matrix. Syntactic foams containing glass hollow spheres and reinforced with CNFs have been studied for their thermal, electrical and mechanical properties. The advantages provided by CNF reinforcement as well as the challenges associated with maximizing the benefits of CNF reinforcement will be discussed.

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Plasma Electrolytic Deposition and Process Modeling
Linxin Zhu, NJ Institute of Technology

Abstract:
Plasma Electrolytic Deposition is a promising technique for new generation of Boronizing, Nitriding, Caburizing, and Oxidation. This technique takes advantage of Joule heating to achieve a micrometer gaseous layer covering the metal, and with high potential difference between the sides of gaseous layer, molecules containing in the diffusion source will be ionized and be attracted to the metal which serve as electrode. This technique is conducted in an open system without sealing chamber and high vacuum. It's much more faster, green, and energy savings than conventional techniques. Also, unique controllable porous surface is a perfect structure for tissue growing. In the presentation, we will introduce our work of developing the explanation of the basic principle and mechanism of both plasma electrolytic saturation and oxidation. We also use FEM to model the experiment procedure for better parameter controlling.
Chair’s Message  (Cont. from page 1)  

meetings, contributing ideas and suggestions, and hopefully, joining the executive committee. We welcome any new members to the committee and can work around your schedule and needs. We look forward to any volunteers.

I hope the summer went well for all, and we enjoyed the cool and wet July. For me, this was good for my vegetable garden.

Best wishes after the summer for a good autumn season.

Dr. Robert Sherman, Chapter Chair
Applied Surface Technologies
roberts@co2clean.com

Nikhil Gupta Joins Editorial Board of ASTM Journal

ASM member and past chair of the Metro NY/NJ Chapter Dr. Nikhil Gupta recently joined the editorial board of journal Materials Performance and Characterization published by ASTM International. This flagship materials related journal of ASTM is aimed at addressing practical aspects of the processing, structure, properties, and performance of materials used in mechanical, transportation, energy and medical devices. The society establishes standards, test methods, specifications, guides, and practices that support industries and governments worldwide, and publishes eight different peer-reviewed journals.

Gupta is a faculty member in the Department of Mechanical and Aerospace Engineering at NYU. He is also serving on the editorial boards of Materials Science and Engineering A, Composites Part B, and Journal of Composites. His research areas include lightweight materials, micro and nano-composites, biomaterials and bio-inspired materials, and damage sensing.

September 16, 2014 Meeting

Meson Madrid
343 Bergen Boulevard
Palisades Park, NJ 07650
201-947-1038

A direct link to Google® maps is available on their website
www.mesonmadrid.com

Coming Events

ASM Metro NY-NJ Chapter

9/16/14 (Tuesday) 6:15pm
Meson Madrid, Palisades Park, NJ
Student Research Presentations
Junjun Ding, Stevens Institute of Tech.
Steven E. Zeltmann, NYU Polytechnic
Linxon Shu, WJ Institute of Technology
(See pages 2 & 3)

10/23/14 (Thursday) 6:15pm
L’Affaire, Mountainside, NJ
“Covetic Nanomaterials & Energy Applications”
David R. Forrest, Sc.D, PE
Advanced Manufacturing Office,
Dept. of Energy

11/20/14 (Thursday) 6:15pm
L’Affaire, Mountainside, NJ
Trustee’s Visit
Program topic to be announced
Dr. Sunniva Collins
ASM Board of Trustees

Meetings will not be held in December or January

Check the Chapter website for the latest updates and information:
http://metronynj.asminternational.org

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A direct link to Google® maps is available on their website