SARS-CoV-2 is the virus that causes coronavirus disease (COVID-19) which has reached pandemic levels resulting in significant morbidity and mortality affecting every inhabited continent. The large number of patients requiring intensive care threatens to overwhelm healthcare systems globally. Likewise, there is a compelling need for a COVID-19 disease severity test to prioritize care and resources for patients at elevated risk of mortality. In this talk, an integrated point-of-care COVID-19 Severity Score and clinical decision support system is presented using biomarker measurements of C-reactive protein (CRP), N-terminus pro B type natriuretic peptide (NT-pro-BNP), myoglobin (MYO), D-dimer, procalcitonin (PCT), creatine kinase–myocardial band (CK-MB), and cardiac troponin I (cTnI). This COVID-19 Severity Score combines multiplex biomarker measurements and risk factors in a statistical learning algorithm to predict mortality. The COVID-19 Severity Score is trained and evaluated using data from 160 hospitalized COVID-19 patients from Wuhan, China. Our analysis finds that COVID-19 Severity Scores are significantly higher for the group that died versus the group that is discharged with median (interquartile range) scores of 59 (40–83) and 9 (6–17), respectively, and an Area Under the Receiver Operating Curve (AUROC) of 0.94 (95% CI 0.89–0.99). In more recent studies, these efforts have been expanded to include 701 patients with COVID-19 are collected across practices within the Family Health Centers network at New York University Langone Health. A two-tiered model is developed with Tier 1 using easily available, nonlaboratory data to help determine whether biomarker-based testing and/or hospitalization is necessary. Likewise, Tier 2 predicts probability of mortality using biomarker measurements) and age. Both Tier 1 and Tier 2 models are validated using two external datasets from hospitals in Wuhan, China comprising 160 and 375 patients, respectively. The Tier 1 and Tier 2 internal validation had AUC (95%
confidence interval) of 0.79 (0.74–0.84) and 0.95 (0.92–0.98), respectively. The Tier 1 and Tier 2 external validation had AUROCs of 0.79 (0.74–0.84) and 0.97 (0.95–0.99), respectively. Collectively these promising initial models pave the way for a point-of-care COVID-19 Severity Score system to impact patient care. Clinical decision support tools for COVID-19 have potential to empower healthcare providers to save lives by prioritizing critical care in patients at high risk for adverse outcomes.

John T. McDevitt now serves as a Full Professor within the Department of Biomaterials at New York University, is a member of NYU’s Bioengineering Institute and participates as a faculty member in the NYU Department of Chemical and Biomolecular Engineering within the Tandon School of Engineering. Prior to this time, he served for 5 years as the Brown-Weiss Professor of Bioengineering and Chemistry at Rice University and rose through the academic ranks at University of Texas at Austin where he was positioned for 20 years. McDevitt completed his Ph.D. degree in Chemistry from Stanford University.

Professor McDevitt is a pioneer in the development of ‘programmable bio-nano-chip’ technologies. He has a strong track record of translating essential bioscience, artificial intelligence and medical microdevice discoveries into real-world clinical practice. In this capacity, he has served as the Scientific Founder for a number of diagnostic and clinical services companies. One of his most recent companies, OraLiva, Inc. features clinical services and diagnostic apps with potential to impact patient treatment and management. McDevitt and his team have raised over $45M in Federal and Foundation support. His recent research has been sponsored by major programs funded by the National Institute of Dental and Craniofacial Research (NIDCR) division of the National Institutes of Health (NIH), National Institute on Drug Abuse (NIDA) at NIH, the Bill and Melinda Gates Foundation, Cancer Prevention Research Institute of Texas (CPRIT), the National Aeronautics and Space Administration (NASA), the Army and the United Kingdom’s Home Office Scientific Development Branch. McDevitt and his team have written more than 200 peer-reviewed scientific manuscripts and have contributed to more than 100 patents and patent applications. This work was recognized with the “2016 AACC Wallace H. Coulter Lectureship Award,” “Best of What's New Award” in the Medical Device Category by Popular Science as well as for the “Best Scientific Advances Award” by the Science Coalition. Dr. McDevitt’s individual honors include the Presidential Young Investigator Award, the California Polytechnic Distinguished Alumni Award and the Exxon Education Award. Over the past years, Dr. McDevitt has served as the Principal Investigator for 6 major clinical trials and 2 clinical pilot studies, all involving the programmable bio-nano-chip. Through these
clinical efforts, mini-sensor ensembles are being developed for major diseases in the areas of COVID-19 disease severity, oral cancer, cardiac heart disease, trauma, drugs of abuse, ovarian cancer and prostate cancer.

Date: Tuesday, February 9, 2021
Time: 7:00 PM (Zoom link available from 6:45 PM).
Place: Zoom Meeting.

Dr. Rolande Hodel, Co-Chair of the Westchester Chemical Society is inviting you to a scheduled Zoom meeting.

Speaker: Dr. John T. McDevitt

Topic: Topic: CLINICAL DECISION SUPPORT TOOL AND RAPID POINT-OF-CARE PLATFORM FOR DETERMINING DISEASE SEVERITY IN PATIENTS WITH COVID-19

Time: Feb. 9, 2021 06:45 PM Eastern Time (US and Canada)
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For further information: contact Rolande Hodel, rrhodel@aol.com,
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Please RSVP by text or email to Rolande Hodel, Peter Corfield or Paul Dillon if you expect to come, to help us plan. But if you do not RSVP, you can still link in.

Please note that screen prints of the Zoom screen may be taken at the meeting and may be submitted for publication in the NY/North Jersey newsletter, The Indicator. If you do not want a photo of yourself submitted, let us know at the meeting.