

FROM DIFFERENTIAL EQUATIONS TO DATA SCIENCE AND BACK

Class of '27 lecture I, March 5, 2018, 4-5pm @ Lally 104

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Invited speaker, SIAM National
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The arrival of massive amounts of data from imaging, sensors, computation and the internet brought with it significant challenges for data science. New methods for analysis and manipulation of big data have come from many scientific disciplines. The first focus of this presentation is the application of ideas from differential equations, such as variational principles and numerical diffusion, to image and data analysis. Examples include denoising, segmentation, inpainting and texture extraction for images. The second focus is the development of new ideas in information science, such as soft-thresholding, sparsity and compressed sensing. The subsequent application of these ideas to differential equations and numerical computation is the third focus of this talk. Examples include soft-thresholding in multiscale computation, solutions with compact support and “compressed modes” for differential equations that come from variational principles, and applications to quantum physics.



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