

2008 Conference on Nonlinear Waves, Rome, Italy
Notes from the forward looking session, July 24, 2008

The session was chaired by Nathan Kutz, University of Washington, and Gabriel Lord, Heriot-Watt University, UK. The event started with a brief review from each of the panel members.

Panelists:

Thorsten Ackemann, University of Strathclyde, United Kingdom

G. Bard Ermentrout, University of Pittsburgh

Laurette S. Tuckerman, École Supérieure de Physique et de Chimie Industrielles, France

Thorsten Ackemann gave an overview of future questions in nonlinear optics such as 3D localization. Bard Ermentrout gave compelling evidence of the growth of mathematical biology, and in particular of neuroscience: The last neuroscience meeting was attended by 34,000 researchers. He also pointed out that this area gives rise to new models, e.g. non-local equations, that need new techniques and theory. Laurette Tuckerman made a plea for more cross-discipline communication through mathematics at the centre to avoid, for example, algorithms being reinvented. Bjorn Sandstede spoke on the development of new techniques and that there was not a lack of problems to be tackled but the need to promote a better culture of review articles to make techniques more accessible.

A discussion followed on the role in modeling and the predictability of 'real life' systems from nonlinear dynamics. The ability to make accurate predictions was proposed as a key aim. It was agreed that reliability and robustness varied from application to application. Often simplifications for estimation from data are not realistic, and parameter estimation not resolved. It was noted that 'real systems' will adapt themselves and parameters to work. Parameter estimation and the ability to make predictions were seen as a future area. The reduction of high dimensional models was discussed and the difficulties recognized in areas where no "master equation" exists. Multiscale analysis was discussed as an area for development.

The meeting finished with a discussion on the role of graduate students and the difficulty in needing to know a wide range of techniques, how to do interdisciplinary work, and how to get to talk to specialists in a field. A role was seen for journal clubs to help with this. It was noted that the situation is different in different countries. A role was seen for Government labs for training.