Modern Applied Mathematics for the Atmospheric and Oceanic Sciences

Monday July 14, 2003

12:00 *week1|Week 1: Numerics - July 14 - 20, 2003*

8:30–9:30 *Continental Breakfast
Orientation, Room Assignment (Students)*

9:30–9:45 *Meeting in Oasis with IPAM Staff (Students)*

10:00–11:30 **Bjorn Engquist** (Princeton University)
Overview of numerical methods for time dependent PDEs

12:00–1:00 *Bruin Deli Lunch (RIPS participants Invited)*

1:00–2:30 **Dale Durran** (University of Washington)
Basic properties of finite-differences for convection

3:00–4:30 **Eitan Tadmor** (University of Maryland)
Numerics and analysis of approximate solution for non-linear time dependent problems

Tuesday July 15, 2003

9:00–10:30 **Bjorn Stevens** (UCLA)
Geophysical interface problems - I

11:00–12:30 **Stanley Osher** (IPAM)
Concepts behind front and shock capturing

12:30–2:00 *Lunch (on your own)*

2:00–3:30 **Bjorn Engquist** (Princeton University)
Numerical methods for front capturing

4:00–5:30 **Dale Durran** (University of Washington)
Dealing with poor resolution: compact differencing and global smoothing

Wednesday July 16, 2003

9:00–10:30 **Eitan Tadmor** (University of Maryland)
High resolution central schemes

11:00–12:30 **Stanley Osher** (IPAM)
Level Set methods

12:30–2:00 *Lunch (on your own)*

2:00–3:30 **Bjorn Stevens** (UCLA)
Geophysical interface problems - II

4:00–5:30 **Bjorn Engquist** (Princeton University)
Computational Multiscale Methods

Thursday July 17, 2003

9:00–10:30 **Dale Durran** (University of Washington)
Dealing with poor resolution: locally enhanced smoothing

11:00–12:30 **Eitan Tadmor** (University of Maryland)
Spectral Methods for time-dependent problems

12:30–2:00 *Lunch (on your own)*

2:00–3:30 **Stanley Osher** (IPAM)
Level-Sets and Multi-Phase Flow

4:00–5:30 **Bjorn Stevens** (UCLA)
A toy one-dimensional problem

Friday July 18, 2003

12:00 *Students work on Projects*

11:00–12:00 **Bjorn Engquist** (Princeton University)
Modern multiscale simulation

12:00–1:30 *Pizza Lunch (RIPS participants Invited)*

Saturday July 19, 2003

12:00 *Students work on Projects*

Sunday July 20, 2003

12:00 *Visit to the Getty Center*

Monday July 21, 2003

12:00 *week2|Week 2: Asymptotics - July 21 - 27, 2003*

9:00–10:15 **Gregory Hakim** (University of Washington)
Geophysical motivations for multiscale asymptotics

10:45–12:00 **Peter Kramer** (Rensselaer Polytechnic Institute)
Parameterization in turbulent transport

12:00–1:30 *Lunch (on your own)*

1:30–2:45 **Rupert Klein** (Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB))
A tutorial on multiscale asymptotics

3:15–4:30 **Andrew Majda** (New York University)
An Introduction to wave averaging

Tuesday July 22, 2003

8:30–9:45 **James McWilliams** (UCLA)
The Multiscale asymptotics of Waves-Winds and Currents (WWC) - I

10:00–11:15 **Peter Kramer** (Rensselaer Polytechnic Institute)
Homogenization theory (Framework)

11:30–12:45 **Andrew Majda** (New York University)
Equatorial multiscale theory-I

12:45–1:45 *Lunch (on your own)*

1:45–3:00 **Gregory Hakim** (University of Washington)
Extratropical asymptotics of the atmosphere

Wednesday July 23, 2003

9:00–10:15 **Andrew Majda** (New York University)
Majda Equatorial multiscale theory-II

10:45–12:00 **Gregory Hakim** (University of Washington)
Extratropical asymptotics of the atmosphere

12:00–1:30 *Lunch (on your own)*

1:30–2:45 **James McWilliams** (UCLA)
WWC-multiscale theory - II

3:15–4:30 **Rupert Klein** (Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB))
A unified approach to meteorological modeling-I

5:00–7:00 *Dinner (Hosted by IPAM)*

Thursday July 24, 2003

8:30–9:45 **James McWilliams** (UCLA)
WWC-multiscale theory - III

10:00–11:15 **Rupert Klein** (Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB))
A unified approach to meteorological modeling - II

11:30–12:45 **Peter Kramer** (Rensselaer Polytechnic Institute)
Homogenization theory (Lessons)

Friday July 25, 2003

12:00 *Students work on Projects*

Saturday July 26, 2003

12:00 *Students work on Projects*

Sunday July 27, 2003

12:00 *Visit to Venice Beach*

Monday July 28, 2003

12:00	*week3|Week 3: Stochastics - July 28 - August 2, 2003*
9:00–10:15	**Kerry Emanuel** (Massachusetts Institute of Technology) *Fundamentals of atmospheric convection*
10:45–12:00	**David Levermore** (University of Maryland) *Introduction to the Boltzmann Equation*
12:00–1:30	*Lunch (on your own)*
1:30–2:45	**Markos Katsoulakis** (University of Massachusetts) *Intro to statistical mechanics*
3:15–4:30	**Eric Vanden-Eijnden** (New York University/Courant Institute of Mathematical Sciences) *Stochastic process theory*

Tuesday July 29, 2003

8:30–9:45	**Kerry Emanuel** (Massachusetts Institute of Technology) *Convective equilibrium*
10:00–11:15	**George Craig** (University of Reading) *Stat-Mech of atmospheric convection-I*
11:30–12:45	**Markos Katsoulakis** (University of Massachusetts) *Stochastic lattice dynamics*
12:45–1:45	*Lunch (on your own)*
1:45–3:00	**David Levermore** (University of Maryland) *Radiative Transport and other Kinetic Equations*

Wednesday July 30, 2003

9:00–10:15 **Kerry Emanuel** (Massachusetts Institute of Technology)
Convection and larger-scale circulations

10:45–12:00 **George Craig** (University of Reading)
Stat-Mech of atmospheric convection-II

12:00–1:30 *Lunch (on your own)*

1:30–2:45 **Markos Katsoulakis** (University of Massachusetts)
Large-scale limits

3:15–4:30 **Eric Vanden-Eijnden** (New York University/Courant Institute of Mathematical Sciences)
Stochastic differential equations - I

Thursday July 31, 2003

8:30–9:45 **David Levermore** (University of Maryland)
Entropy-Based Closures

10:00–11:15 **George Craig** (University of Reading)
Stat-Mech of Atmospheric convection-III

11:30–12:45 **Eric Vanden-Eijnden** (New York University/Courant Institute of Mathematical Sciences)
Stochastic differential equations - II

Friday August 1, 2003

12:00 *Students work on Projects*

11:00–12:00 **Eric Vanden-Eijnden** (New York University/Courant Institute of Mathematical Sciences)
Effective dynamics in Lorenz 95 system

12:00–1:00 *Lunch at IPAM (RIPS participants Invited)*

Saturday August 2, 2003

12:00 *Students work on Projects*