

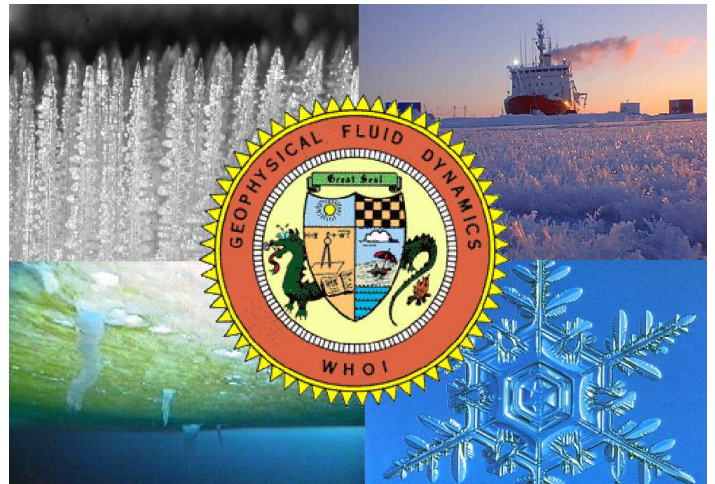
## GFD Newsletter 2006

### Faculty of Walsh College



*The 2006 GFD Photograph.*

usual magic in the Lab. We continue to be indebted to W.H.O.I. Education, who once more provided a perfect atmosphere. Jeanne Fleming, Penny Foster and Janet Fields all contributed importantly to the smooth running of the program.



*The dragon enters the ice field.*

### *A Sketch of the Summer*

Ice was the topic under discussion at Walsh Cottage during the 2006 Geophysical Fluid Dynamics Summer Study Program. Professor Grae Worster (University of Cambridge) was the principal lecturer, and navigated our path through the fluid dynamics of icy processes in GFD. Towards the end of Grae's lectures, we also held the 2006 GFD Public Lecture. This was given by Greg Dash of the University of Washington, on matters of ice physics and a well-known popularization: "Nine Ices, Cloud Seeding and a Brother's Farewell; how Kurt Vonnegut learned the science for Cat's Cradle (but conveniently left some out)." We again held the talk at Redfield Auditorium, and relaxed in the evening sunshine at the reception afterwards. As usual, the principal lectures were followed by a variety of seminars on topics icy and otherwise. We had focussed sessions on sea ice, the impact of ice on climate, and glaciology.

John Wettlaufer, nimbly assisted by Neil Balmforth, directed the summer program, and almost single-handedly took on the supervision of the fellows. Some important acknowledgements: Young-Jin Kim (University of Chicago) helped out with the computers during the first few weeks, and Keith Bradley worked his

### *Schedule of Principal Lectures*

#### Week 1:

*Monday, June 19:* Introduction to Ice

*Tuesday, June 20:* Diffusion-controlled solidification

*Wednesday, June 21:* Interfacial instability in super-cooled fluid

*Thursday, June 22:* Interfacial instability in two-component melts

*Friday, June 24:* Formation of mushy layers

#### Week 2:

*Monday, June 26:* Idealized mushy layers

*Tuesday, June 27:* Convection in mushy layers

*Thursday, June 29:* Interfacial pre-melting

*Friday, June 30:* Thermomolecular flow, thermal regelation and frost heave



Our Principal Lecturer, before and after his winning final play of the staff versus fellows softball game.



The fellows in action, plus some other familiar faces  
 (1) Shane and Devin; (2) Victor;  
 (3) Dominic, Devin, Dan and Victor; (4) Rob;  
 (5) Shane, Dominic, Rachel and Takahide; (6) Shane;  
 (7) Rob, Rachel and Victor; (8) Ian;  
 (9) Rachel, Devin and Victor; (10) Takahide;  
 (11) Dan, Ian and Dominic.

## Fellows' Reports

Devin Conroy, University of California at San Diego  
*Growth of a mushy layer in a corner flow*

Ian Eisenman, Harvard University  
*Arctic catastrophes in an idealized sea ice model*

Daniel Goldberg, New York University  
*Glancing interactions of large internal waves*

Sean Keating, University of California at San Diego  
*Mush! Convective patterns in mushy layers*

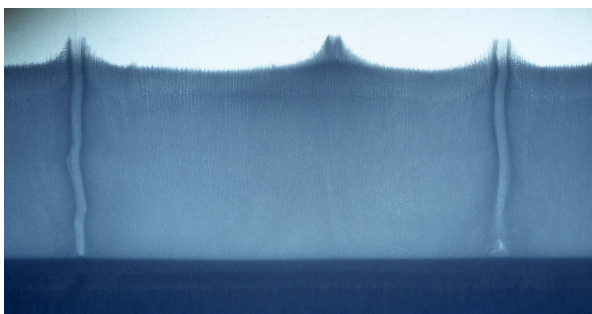
Takahide Okabe, University of Texas at Austin  
*Mixing efficiency*

Robert Style, University of Cambridge  
*Salty drops: solidification and instabilities*

Victor Tsai, Harvard University  
*Ice stars*

Dominic Vella, University of Cambridge  
*On thin ice*

Rachel Zammett, University of Oxford  
*Dambusters: catastrophic incisions in natural dams*



Chimneys in a mushy layer; the patterns that motivated the projects of Devin and Shane.



Photographs graciously provided by Takahide.

## Softball Report

Joseph V. McKee Ballfield									
Team	1	2	3	4	5	6	7	8	Total
Facilities	0	6	2	2	0	0	0	0	10
G.F.D.	5	0	5	0	1	0	0	0	11

*The softball team relishing a successful evening*

We had remarkable success in softball this year. As usual, those with “experience” had not played since grade school, and it took time for the dynamos to gel. The most progress was made by Rachel, who developed into a very good catcher and got to base almost every time, even though her hits never left the infield. Dominic and Rob made effective outfielders, and Rob’s powerful bat challenged the best hitters in the league. Shane spent much of the summer swinging at an illusion, but by the end of the season his bat talked for him. Taka turned into a fast, quiet outfielder who batted very well. Our four Americans came through, each in his own fashion. When we were up, Ian spent a large part of the time practicing his swing and actually made progress. Devin could powerfully drive the ball over the fence. Dan hit “Texas leaguers” that kept us in competition. Victor grew throughout the season and turned into a fabulous shortstop, never dropping a ball. In the last game, the staff fielded a rag-tag team against the fellows. From the first plays it looked like the fellows would walk away with victory. However, the staff inched their way back into contention and nearly won, but for Dan coming in as the closing pitcher and retiring his side. The summer ended with 4 wins and 4 losses, not bad for an inexperienced side playing against seasoned teams.

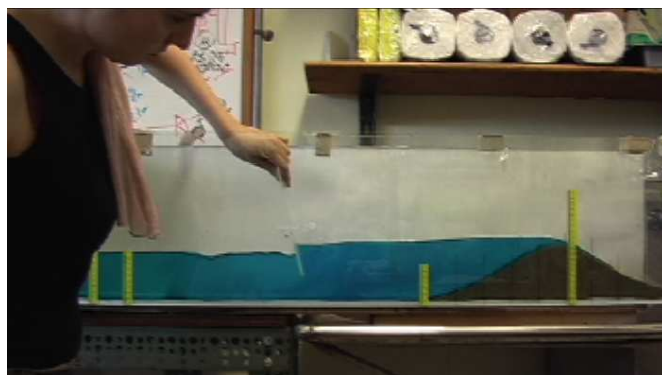


*Despite stacking its team with seasoned veterans, the staff lost out to the fellows in the summer’s closer.*

## The GFD Website

The lectures notes and reports are available online at [gfd.who.i.edu](http://gfd.who.i.edu). The GFD website also contains:

- lecture and seminar schedules
- electronic versions of proceedings and newsletters
- lists of alumni and visitors
- application materials
- picture galleries of life at GFD
- useful information and links.

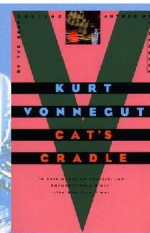


*Rachel initiates a seiche in a tank, subsequently swings in time, intent on busting a sandy dam.*

## The Sears Public Lecture


In 2006 the Sears Public Lecture was delivered by Professor Greg Dash, of the University of Washington. Professor Dash started with the physics of ice structure and emphasized connections with meteorology, the field of Kurt Vonnegut’s brother. He then switched to personal experiences with the Vonnegut brothers, taking us from theoretical condensed matter physics to sociology and back.

**Nine Ices, Cloud Seeding and a Brother's Farewell;**  
 how Kurt Vonnegut learned the science for Cat's Cradle (but conveniently left some out)



**GFD Public Lecture, 2006**  
**June 22, 5:00pm**  
 Redfield Auditorium, W. H. O. I.  
 Reception to follow

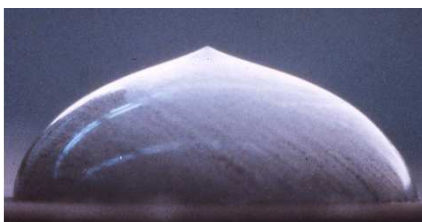
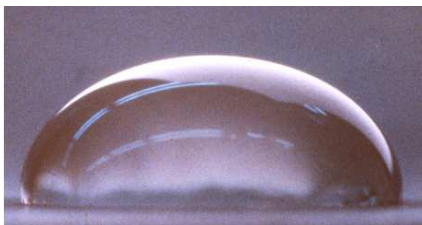
**Professor Greg Dash**  
 Department of Physics  
 University of Washington



## The GFD Faculty

The GFD Faculty handles the scientific and administrative duties of the school. This group is made up of members of the scientific community, across several disciplines, united by their interest in GFD. These are the faces to be seen at GFD over future summers, and their research interests help to define the scientific direction and flavor of the Program.

Neil Balmforth *University of British Columbia*  
 Oliver Buhler *New York University*  
 Claudia Cenedese *W. H. O. I.*  
 Eric Chassignet *University of Miami*  
 Charles Doering *University of Michigan*  
 Glenn Flierl *M. I. T.*  
 Karl Helfrich *W. H. O. I.*  
 Lou Howard *M. I. T. and Florida State University*  
 Joseph Keller *Stanford University*  
 Richard Kerswell *University of Bristol*  
 Norman Lebovitz *University of Chicago*  
 Willem Malkus *M. I. T.*  
 Philip Morrison *University of Texas at Austin*  
 Michael Proctor *University of Cambridge*  
 Antonello Provenzale *ISAC-CNR, Torino*  
 Richard Salmon *Scripps Institution of Oceanography*  
 Edward Spiegel *Columbia University*  
 Jean-Luc Thiffeault *Imperial College, London*  
 George Veronis *Yale University*  
 John Wettlaufer *Yale University*  
 Jack Whitehead *W. H. O. I.*  
 William Young *Scripps Institution of Oceanography*



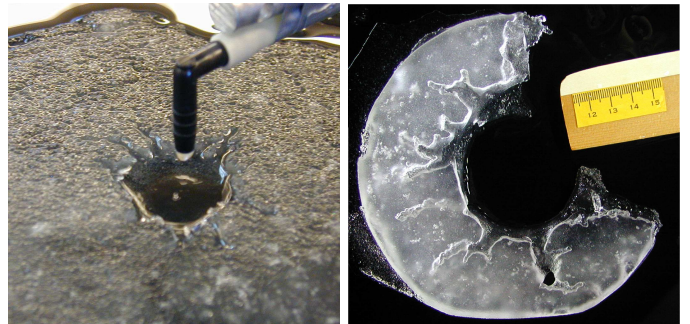
*Grae's cuspy, freezing drops (before and after)*

## Contributions

The GFD program has established an endowment fund to help support the program in the future and for a specially funded position intended to help finance the extended visit of a key participant, such as the summer's Principal Lecturer. The fund is administered by WHOI, under the guidance of George Veronis. If you would like to contribute, please send your check (made payable to WHOI) to

Woods Hole Oceanographic Institution  
 GFD Fund, MS 40  
 Woods Hole, MA 02543

Donations can also be made by credit card by calling the Development office at 508-289-4895.



*Victor's laboratory ice stars; fingering of water flow through ice. The photograph below, courtesy of John Wettlaufer, shows the real thing in ice-covered water near his winter home.*

Please send comments to [njb@math.ubc.ca](mailto:njb@math.ubc.ca) if you have any suggestions regarding this newsletter or the GFD Program.

The GFD Program is funded by the National Science Foundation and the Office of Naval Research.