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# 1 General Agenda

## 1.1 Registration, Tue 08:00-08:30

## 1.2 Planery Session, Tue 08:30 - 12:30

### 1.2.1 Moderator: Eric Chassignet

- 08:30 - 08:40 Eric Chassignet: *Welcome*
- 08:40 - 09:00 John Shephard: *Workshop Motivation and Objectives*
- 09:00 - 09:30 Tamay Özgökmen: *Highlights from CARTHE*
- 09:30 - 10:00 Eric D'Asaro: *Overview of Submesoscale Transport*
- 10:00 - 10:30 Joe Katz: *Overview of Oil Small-Scale Physics*

10:30 - 11:00 Coffee Break

- 11:00 - 11:30 Villy Kourafalou/Dubravko Justic: *Overview of River/Coastal Processes*
- 11:30 - 12:00 Michel Bouffadel: *Overview of Subsea Oil/Gas Plume Physics*
- 12:00 - 12:30 Shuyi Chen: *Overview of Atmospheric Circulation over the Gulf*

12:30 - 13:30 Lunch

## 1.3 Subgroup Breakouts, Tue 13:30 - 18:15, Wed 08:30 - 16:30

## 1.4 Social Event, Tue 18:00

## 1.5 Planery Session, Thu, 09:00 - 15:00

### 1.5.1 Moderator: Tamay Özgökmen

- 09:00 - 12:30 Subgroups report back in plenary
- 12:30 - 13:30 Lunch
- 13:30 - 14:00 David Halpern: *Discussion on NAS Gulf Research Program and Core-1 connections to large-scale Loop Current research*
- 14:00 - 14:30 Cecilie Mauritzen: *Discussion on connections to Core-7 Operational Oceanography and Oil Spill Modeling Workshop*
- 14:30 - 15:00 Conclusions, next steps, and closing remarks

## 2 Coastal-River Group Breakout Agenda

### 2.1 Coastal-River Group Day 1: 15 January 2019, Tuesday

- **13:30 - 13:45** Introduction and charge: Dubravko Justic (Louisiana State University), Villy Kourafalou (University of Miami) and Giulio Mariotti (Louisiana State University)

#### 2.1.1 Physics/Hydrodynamics, Moderator: Villy Kourafalou

- **13:45 - 14:00** Villy Kourafalou (University of Miami)
- **14:00 - 14:15** Robert Weisberg (University of South Florida)
- **14:15 - 14:30** Annalisa Bracco (Georgia Tech)
- **14:30 - 14:45** Gregg Jacobs (Naval Research Laboratory)
- **14:45 - 15:00** Arnoldo Valle-Levinson (University of Florida)
- **15:00 - 15:15** Ruoying He (North Carolina State University)
- **15:15 - 15:30** Chunyan Li (Louisiana State University)

**15:30 - 16:00** Coffee Break

- **16:00 - 16:15** Steve Morey (Florida State University)
- **16:15 - 16:30** Matthieu Le Henaff (University of Miami and NOAA/AOML)
- **16:30 - 16:45** Brian Dzwonkowski (University of South Alabama)
- **16:45 - 17:00** Haosheng Huang (Louisiana State University)

**18:00** Social Event

## **2.2 Coastal-River Group Day 2: 16 January 2019, Wednesday**

### **2.2.1 Remote Sensing/Sediments, Moderator: Giulio Mariotti**

- **08:30 - 08:45** Giulio Mariotti (Louisiana State University)
- **08:45 - 09:00** Chuanmin Hu (University of South Florida)
- **09:00 - 09:15** Jeff Nitrouer (Rice University)

### **2.2.2 Oil/Biogeochemistry/Ecosystems/Management, Moderator: Dubravko Justic**

- **09:15 - 09:30** Dubravko Justic (Louisiana State University)
- **09:30 - 09:45** Ed Overton (Louisiana State University)
- **09:45 - 10:00** Brian Roberts (Louisiana Universities Marine Consortium)

**10:00 - 10:30** Coffee Break

- **10:30 - 10:45** Katja Fennel (Dalhousie University)
- **10:45 - 11:00** Jerry Wiggert (University of Southern Mississippi)
- **11:00 - 11:15** Christopher Barker (NOAA)
- **11:15 - 11:30** Kenny Rose (University of Maryland)

**11:30 - 12:30** Group Discussion

**12:30 - 13:30** Lunch

### **2.2.3 Coastal-River Group Discussion**

**13:30 - 15:00** Group Discussion

**15:00 - 15:30** Coffee Break

**15:30 - 17:00** Group Discussion

### 3 Plume Group Breakout Agenda

The following sessions are organized as **Near-Field (NF)**, **Mid-Field (MF)**, and **Far-Field (FF)**. But some talks would be re-scheduled if a speaker has to be within the other group meeting during the allotted time.

It is advisable that each speaker summarizes what was done prior to DWH and the latest developments since the DWH including their own work.

#### 3.1 Plume Group Day 1: 15 January 2019, Tuesday

- **13:30 - 13:50** Introduction and charge: Michel Boufadel (NJIT), Scott Socolofsky (TAMU), William Dewar (FSU)

##### 3.1.1 Near-Field (Predominantly), Moderator: Michel Boufadel

- **13:50 - 14:00** Michel Boufadel: *Correlations and numerical models for droplets. Churn flow. NF.*
- **14:00 - 14:10** Joseph Katz: *Primary breakup. NF.*
- **14:10 - 14:20** Lin Zhao: *The VDROPI model. NF.*
- **14:20 - 14:30** Bruno Fraga: *Numerical Simulation of Bubble Plumes: from Bubble-Induced Turbulence to Integral Plume Properties. NF, MF.*
- **14:30 - 14:40** Di Yang: *LES simulation and capturing the intrusions. NF, MF*
- **14:40 - 14:50** Ira Leifer: *Movement and behavior of bubbles. NF. FF.*

**14:50 - 15:30 Summary** of before and after DWH (no need to separate between GOMRI funded versus other sources, as many researchers got funding from both or got funding from NSF but teamed up with researchers funded from GOMRI. Also GOMRI funding was much larger than other funding).

**Discussion:** How far are we from predicting the oil droplet size distribution and the bubble size distribution from oil only? In the presence of dispersants? From 3 phase plumes (oil, gas, and water)? In the presence of dispersant? What instrumentation/experiments are needed to address the issues presented herein?

**15:30 - 16:00** Coffee Break

### 3.1.2 Mid-Field (Predominantly), Moderator: Scott Socolofsky

- **16:00 - 16:10** Alex Fabregat: *Impact of bubble buoyancy on plumes. MF.*
- **16:10 - 16:20** Andrea Prosperetti: *Multiphase plumes and intrusions. MF.*
- **16:20 - 16:30** Chris Barker: *How does GNOME handle plumes and droplets. NF, MF, FF.*

**16:30 - 17:30 Summary** of before and after DWH (no need to separate between GOMRI funded versus other sources, as many researchers got funding from both or got funding from NSF but teamed up with researchers funded from GOMRI. Also GOMRI funding was much larger than other funding).

**Discussion:** How do multiphase plumes differ from single phase plumes (NF and MF) Is there a major impact of the riser and near jet dynamics on the spatial distribution of droplets and bubbles within the plume? How to accurately account for dispersant in plume dynamics? What instrumentation/experiments are needed to address the NF/MF issues presented herein? New questions are welcome.

**18:00 pm** Social Event

## 3.2 Plume Group Day 2: 16 January 2019, Wednesday

### 3.2.1 Mid-Field (Predominantly), Moderator: William Dewar

- 08:30 - 08:40 William Dewar: *Nesting and multiscale modeling. NF, MF.*
- 08:40 - 08:50 Scott Socolofsky: *TAMOC, intrusions, multiphase plumes. NF, MF.*
- 08:50 - 09:00 Bruno Deremble: *Rotating flows. MF.*
- 09:00 - 09:10 Paul Linden: *Plume precession. MF.*
- 09:10 - 09:20 Andrew Poje: *Rotating, stratified, multiphase plumes. MF.*
- 09:20 - 09:40 Guangyu Xu: *Modeling and measurements of hydrothermal flows. MF.*

**09:40 - 10:30 Summary** of before and after DWH (no need to separate between GOMRI funded versus other sources, as many researchers got funding from both or got funding from NSF but teamed up with researchers funded from GOMRI. Also GOMRI funding was much larger than other funding).

**Discussion:** How far are we from complete nesting? How well do we understand plumes in cross flow? Stratification? What instrumentation/experiments are needed to address the MF/FF issues presented herein? New questions are welcome.

### 3.2.2 Far-Field, Moderator: Scott Socolofsky

- 10:30 - 10:40 Michel Boufadel: *Transport of rising droplets near the water surface.*
- 10:40 - 10:50 Amy McFadyen: *How does the GNOME model handle the far field movement of oil droplets (surface and subsurface)? FF.*
- 10:50 - 11:00 Samuel Arey: *Impact of oil chemistry on the transport of various components. Dissolution. Release from the oil phase. NF, MF, FF.*
- 11:00 - 11:10 Nicolas Wienders: *Drifters. FF.*
- 11:10 - 11:20 Scott Socolofsky: *Modeling of oil droplet biodegradation. FF.*
- 11:20 - 11:30 Claire Paris: *Multiscale modeling of oil droplet transport. MF, FF.*

**11:30 - 12:30 Summary** of before and after DWH (no need to separate between GOMRI funded versus other sources, as many researchers got funding from both or got funding from NSF but teamed up with researchers funded from GOMRI. Also GOMRI funding was much larger than other funding).

**Discussion:** Impact of water surface on modeling droplet transport from blowouts? Modeling biodegradation (surface or first order decay based on mass)? Impact? What instrumentation/experiments are needed to address the FF issues presented herein? New questions are welcome.

**12:30 - 13:30 Lunch Break**

### **3.2.3 Plume Group Discussion**

**13:30 - 16:30**

- Near Field, Mid-Field, and Far Field.
- Comparison between multiphase and single phase plumes.
- What additional experiments/model are needed?
- New Questions?
- Contribution of various consortia/groups (summary).
- Connection to other themes. Toxicity and public health. Outreach.
- Connection to other fields of science and engineering (e.g., volcano blowouts, air plumes, etc.).



## 4 Small-Scale Group Breakout Agenda

The full name is:

### **Small-scale/near-surface/sub-mesoscale observations and modeling group**

The sessions are divided to several topics with some exceptions to address travel/attendance constraints and scheduling conflicts with other sessions. The presentation is allocated 30 min, including a 1-20 min presentation, followed by a 10-15 min discussion. Each speaker is expected to summarize the state-of-the-art prior to DWH and the GoMRI program, and the advancements since then, including his/her own research. Each session is assigned a moderator.

### **4.1 Small-scale Group Day 1: 15 January 2019, Tuesday**

- **13:30 - 13:45** Introductions: Joe Katz (droplet generation and dynamics) and Eric D'Asaro (submesoscale circulation)

#### **4.1.1 Submesoscale Phenomena, Moderator: Eric D'Asaro**

- **13:45 - 14:15** Baylor Fox-Kemper: *Eulerian and Lagrangian - novel deep connections between fronts, waves, and turbulence*
- **14:15 - 14:45** Jeroen Molemaker: *Surface convergence and downwelling at submesoscale fronts*
- **14:45 - 15:15** Tony Dalrymple: *Transport by surface waves and currents*
- **15:15 - 15:45** Brian Haus: *Short scale ocean waves and near surface currents*

**15:45 - 16:15** Coffee Break

#### **4.1.2 Langmuir and Waves, Moderator: Marcelo Chamecki**

- **16:15 - 16:45** Ramsey Harcourt: *Transport and dispersion by mixed layer turbulence and surface gravity waves*
- **16:45 - 17:15** Di Yang: *Multi-scale turbulence-resolving model framework for oil plume dispersion*
- **17:15 - 17:45** Marcelo Chamecki: *Oil droplet size on dilution and transport near the ocean surface*
- **17:45 - 18:15** Eric D'Asaro: *Transport & Discussion*

**18:00** Social Event

## 4.2 Small-scale Group Day 2: 16 January 2019, Wednesday

### 4.2.1 Drops, Bubbles and Interfaces, Moderator: CJ Beegle-Kraus

- 08:30 - 09:00 Joe Katz: *Breakup of oil slicks and plumes*
- 09:00 - 09:30 CJ Beegle-Kraus: *Oil droplets, from birth to death*
- 09:30 - 10:00 Michel Boufadel: *Oil particle interaction, potentials for dispersing oil using particles*
- 10:00 - 10:30 Vijay John: *New concepts in dispersion and herding through understanding the oil-water interface*

10:30 - 10:45 Coffee Break

- 10:45 - 11:15 Andrea Prosperetti: *Stratified drop/bubble, and dissolution of a multi-component drop*
- 11:15 - 11:45 Kate Stebe: *Particle and microbe aggregation and surface interactions in the context of oil spills*
- 11:45 - 12:15 Jian Sheng: *EPS aggregates formation over a rising micro oil droplet.*
- 12:15 - 12:30 Joe Katz: *Drops wrap-up*

12:30 - 13:30 Lunch Break

### 4.2.2 Small-Scale Group Discussion

13:30 - 16:30

- Overflow presentations
- Discussion on synthesis objectives and scope
- Writing Assignments
- New Questions and potential future directions