

The FAMOS school day: Fostering confidence in a diverse body of early-career polar marine scientists

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Abstract

The Forum for Arctic Modeling and Observational Synthesis (FAMOS) is a project funded by the U.S. National Science Foundation to advance the science of Arctic physical, chemical, and biological marine modeling. It is further designed to foster collaboration with marine observationalists and those who wish to work with Arctic marine modelers, e.g., atmospheric scientists, glaciologists, hydrologists, terrestrial ecologists. FAMOS holds an annual workshop of ~120 people and spawns numerous collaborative projects that have filled three special JGR collections and more. Attendance at FAMOS workshops is a mix of senior researchers and early-career scientists. The final three days of the 4-day workshop consist of AGU-style short talks, break-out sessions, and panel discussions. But the first day is devoted to the FAMOS School, wherein ~40 graduate students, postdocs, and early career polar scientists attend 5 longer-format (~35 minute) lectures. Discussion sessions are especially highlighted, and senior scientists in attendance are not allowed to speak. A “wild card” after-lunch session is devoted to various topics, e.g., outreach, alternate career choices, and geoengineering. The day ends with a working dinner in which further discussions and networking occur. School attendees are typically gender-balanced and have included students from non-traditional Arctic countries (e.g., Iran, Brazil, Egypt). The FAMOS School has been very successful, as measured by participant feedback and by the number of applications received (i.e., more than we can accommodate each year). A key outcome has been to bolster confidence in the early-career students, so that they are more willing to actively participate in the following days’ activities. This is also enhanced by naming them as session and discussion chairs, and by suppressing the tendency of senior scientists to “hog the microphone.” Discussion at FAMOS workshops has significantly influenced the focus of many PhD projects and spawned a number of student-led research papers. A main lesson learned from the FAMOS School is that just inviting students to a workshop or into a research community is not enough: One must also take active steps to foster confidence and give them a voice. The good news is that this really works.

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What is FAMOS?



The **Forum for Arctic Ocean Modeling and Observational Synthesis (FAMOS)** is an international effort to make progress in

- **Arctic** (not Antarctic)
- **Marine** (not terrestrial)
- **Modeling** (not observations).

"**Arctic**" includes subarctic areas such as the Nordic Seas. "**Marine**" includes physical, chemical, and biological studies of ocean and sea ice. "**Modeling**" mostly indicates numerical simulation, but also includes laboratory and theoretical studies.

Beyond these topics, FAMOS has participation from **disciplines** that impact the Arctic marine system, e.g., atmospheric, glaciological, and hydrologic sciences.

Further, FAMOS encourages strong participation from **observationalists** who collect data via field work or satellites. Modelers need observations for initialization, assimilation, validation, and parameterization development; observationalists need modelers to interpolate and extrapolate their sparse data in space and time, and to guide observational programs. But the collaboration runs deeper than this: Observationalists make scientific advances that serve to inspire new modeling work, and vice versa.

The **FAMOS project** started in 2011, an outgrowth of an initial project called AOMIP (Arctic Ocean Model Intercomparison Project) that started in 1999. FAMOS is fundamentally a **collaboration accelerator**. It consists of:

- An **annual meeting** during which talks and discussions lead to new projects and proposals
- Ongoing **projects** that are eventually published, in part in J. Geophysical Research special issues (there have been three since 1999)

Major **funding** for FAMOS comes from the U.S. National Science Foundation, Office of Polar Research, and the Canadian Government.

FAMOS Annual Workshop



FAMOS annual meeting participants
October 2016 at Woods Hole Oceanographic Institute

The annual workshop is held for 2.5 action-packed days Wednesday-Friday, usually in the fall and usually in or near Woods Hole, MA, USA. In 2018 it was held in Bergen, Norway.

The agenda consists of:

- short AGU-style 15 minute **talks**, grouped by topic (e.g., sea ice, large-scale oceanography, small-scale ocean mixing and eddies, biogeochemistry).
- **posters** (and corresponding 1-minute "lightening talks" to advertise these)
- **panel** discussions
- **break-out** sessions
- **meals/happy hour/social** activities

FAMOS is a "bottom-up" activity, i.e., the agenda is set by the submitted talks and posters. Time is also reserved for reporting on ongoing FAMOS collaborations and planning for future collaborations.

Attendance is typically 110-150. **Students and postdocs generally represent 30-40% of participants, and are heavily represented in talks, session management, panel reporting, etc.**

The panels, break-out sessions, and meals/social activities have **one goal in mind: to generate collaborative projects and guide them to publication.** This is the essential characteristic of FAMOS.

Screenshot

FAMOS School



Student introductions at the start of the 2018 FAMOS school. The room will be filled the next day for the main workshop.

The first day (i.e., Tuesday) of the annual workshop week is devoted to the **FAMOS School** for New Arctic Investigators, with 30-50 (maximum) graduate students, postdocs, and a few early-career scientists. Students are required to submit a proposed talk or poster with their application (even if it is only a tentative plan of research): **the idea is that students will be active (not passive) participants at FAMOS.** Applications are accepted first-come, first-served, with travel support reserved for first-time applications and a few returning students if they are especially active in collaborative projects. Other students are free to attend using their own funding; generally > 50% of students use some of their own (i.e., university) funding.

The format consists of:

- 30-40 minute **talks** by 5-6 invited speakers, with corresponding 20-30 minute **discussion** periods.
 - These sometimes have a theme, e.g.,
 - 2015's "**Arctic Sequest**" contest to determine the "best" Arctic sea, with expert speakers on the Bering, Barents, Laptev, Chukchi, and Canadian Polar Shelf Seas
 - 2016's "**Peer-to-peer**" speakers were **early-career investigators within 5 years of PhD**
- A special after-lunch session devoted to topics of interest to early-career investigators, e.g.,
 - **Public outreach:**
 - **student-led demonstrations** of sea ice melt, Arctic Ocean stratification, etc.
 - a National Public Radio host came and conducted student "interviews," followed by a discussion and advice.

Outcomes and the Future

Journal of Geophysical Research Special Issue: Forum for Arctic Modeling and Observational Synthesis (FAMOS) 2: Beaufort Gyre Phenomenon
First published: 1 March 2018
Last updated: 16 October 2020



There have been three special JGR issues devoted to AOMIP/FAMOS collaborative projects. The latest one (2018-2020) focused on the Beaufort Gyre, with **23 out of 38 papers led by student authors.**

Earth's Future

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Sea Ice Targeted Geoengineering Can Delay Arctic Sea Ice Decline but not Global Warming

Lorenza Zampieri | Helge F. Goessling

First published: 09 December 2019 | <https://doi.org/10.1029/2019EF001280> | Citations: 2

Furthermore, we are thankful to Thomas Jung, Mike Steele, and the Forum for Arctic Ocean Modeling and Observational Synthesis (FAMOS) community for the support and very helpful discussions.

The above is a **student-led publication inspired by the 2017 FAMOS school geoengineering session.**

An example of student feedback:

- *What makes the FAMOS meeting so great to me is the active nature of the event. The presentations have a very high quality and I could learn a lot during these few days, but there is much more to it. I just love listening to all the great minds discussing scientific ideas, interesting concepts or even just computational issues. I love the relaxed atmosphere of the event where everybody is open and accessible, where I can just walk up to Prof. Big Name and get enough ideas for the next six months of my research. FAMOS is how a true scientific event should look like. People are sharing their ideas for the sake of moving science forward without overprotecting them from others, and there is such a lively discussion that I have not yet seen elsewhere.*