

Conclusions

1. Sea ice is a fascinating multiscale composite with structure similar to many other natural and man-made materials.
2. Mathematical methods developed for sea ice advance the theory of composites and other areas of science and engineering.
3. **Homogenization and statistical physics help *link scales in sea ice and composites***; provide rigorous methods for finding effective behavior; advance sea ice representations in climate models.
4. **Fluid flow** through sea ice mediates **melt pond evolution** and many processes important to climate change and polar ecosystems.
5. Field experiments are essential to developing relevant mathematics.
6. Our research is helping to **improve projections of climate change**, the fate of Earth's sea ice packs, and the ecosystems they support.