

# KOHOUT EARLY CAREER AWARD

*Presented to*  
**Christa A. Kelleher**

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Hydrogeology Division  
The Geological Society of America

## Christa A. Kelleher



Christa Kelleher is an Assistant Professor at Syracuse University, holding appointments in the Department of Earth and Environmental Sciences and Department of Civil and Environmental Engineering since 2016. Dr. Kelleher is a hydrologist who uses computational modeling, synthesis of large datasets, and primary observations in the field to inform process-based understanding of hydrologic systems. She is an expert in computational methods that can be used to synthesize large datasets (e.g. national records of streamflow across the US), such that she can study hydrological processes at the regional and continental scale. She has developed expertise in the application of unmanned aerial systems (e.g. drones) to remotely sense environmental variables, such as turbidity, water temperature, and morphology. Among several research themes, her program has developed a strong reputation for advancing the use of drones for environmental remote sensing.

Dr. Kelleher was born and raised in Oregon, growing up surrounded by outdoor recreation and plentiful rivers and streams. This combined with her desire to solve problems and improve resource management led her to study Civil and Environmental Engineering at Lafayette College in Easton, PA. Upon completion of her undergraduate studies, she earned her M.S. and Ph.D. degrees in Civil Engineering at Penn State University under the supervision of Dr. Thorsten Wagener. Her PhD was supported by a Science to Achieve Results Graduate Fellowship from the Environmental Protection Agency. Kelleher next completed a postdoctoral fellowship in the Nicholas School at Duke University, where she met her partner. The two moved to Syracuse University in January 2016, where they continue to develop their expertise as master snow shovelers and explore the wilderness of upstate New York.

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I am proud to introduce Dr. Christa Kelleher as the 2020 recipient of the Francis A. Kohout Early Career Award. Our paths first crossed at Penn State University, where Kelleher earned her M.S. and Ph.D. degrees in Civil Engineering and I had the pleasure of sharing a cramped cold-in-the-winter and hot-in-the-summer cubicle as we grew as scientists and scholars. In those early years of both of our scientific careers, she became a trusted colleague and beloved friend, helping everyone around her reach their highest potential.

Kelleher has initiated a career that combines empirical observations, mathematical models, and the role of local knowledge to advance hydrologic science. Most impressive to me is her ability to translate concepts and tools across a range of problems. While stream temperature and transport have been regular topics in her publication record, she is equally contributing by applying her unique perspective to problems that include catchment hydrology, flood forecasting, land-atmosphere exchange, and urban hydrology. Reflecting on the diversity in her methods and foci, one could interpret that her interests are varied and topical. Respectfully, this writer disagrees. Kelleher's contribution is not to a single process or via a single tool. Rather, she bridges otherwise disparate groups of researchers that would self-identify as either field or model experts, but seldom both. Her unique strength is assimilation of the relative strengths of observational and computational approaches, applying a robust assessment of data in a way that squeezes every bit of knowledge from each without over- nor under-interpreting either. Her body of work is advancing our ability to provide robust forecasts, to maximize the value of data collected, and pioneering advances in model-data feedback.

In addition to her research advances, Christa serves as a role model for budding hydrogeologists. Repeatedly, I have watched her give encouragement and critical feedback to students after their presentations. Her positive attitude and genuine desire to mentor her students, and help those in her colleagues' groups to understand best practices in uncertainty evaluations, is unparalleled. She is the advisor and mentor that we should all strive to be – generous with her time and ideas, but aware that helping students means teaching

them rather than doing work for them.

Kelleher is the model of success for an early career scientist, with a novel trajectory that seamlessly links empirical, computational, and data-driven research approaches to her science. When my students ask me to identify role models, Kelleher is first on my list. I can think of no one more deserving of the Francis A. Kohout Early Career Award.

– Adam S. Ward, *citationist*

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The Kohout Early Career Award is considered annually in accordance with the bylaws of the Division. It is awarded to a distinguished early-career scientist (35 years of age or younger throughout the year in which the award is to be presented or within 5 years of receiving their highest degree or diploma) for outstanding achievement in contributing to the hydrogeologic profession through original research and service, and for the demonstrated potential for continued excellence. The recipient need not be a member of the Hydrogeology Division, or of the Society.

The Kohout Early Career Award is funded by a generous bequest from the estate of Francis A. Kohout, a long-time USGS hydrologist. Francis Kohout was the 1961 recipient of the AGU's Robert E. Horton Award (now Hydrologic Sciences Award). Kohout conducted hydrogeologic and marine geologic research primarily along the continental margin of North America. He is probably best known for the so-called "Kohout convection", the geothermally driven circulation of sea water deep into carbonate platforms (as illustrated in the figure below).

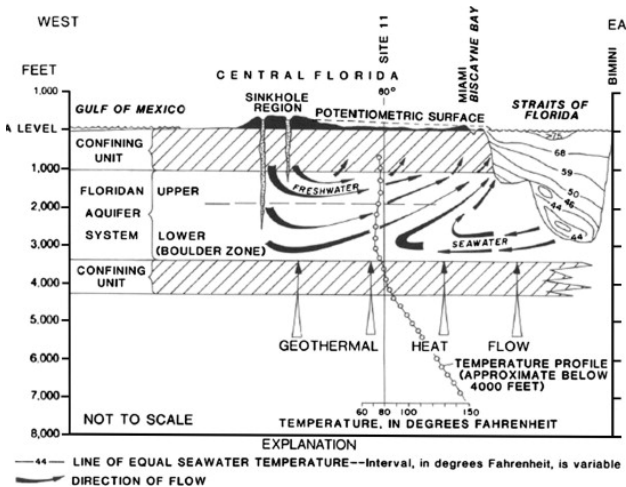


Figure from Kohout, F.A., 1965, A hypothesis concerning cyclic flow of salt water related to geothermal heating in the Floridan aquifer: New York Academy of Sciences Transactions, ser. 2, v. 28, no. 2, p. 249-271.