

# Two if by Sea

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### Profile

#### Yanwu Zhang



Yanwu Zhang confesses a penchant for quantitative reasoning, a personality trait that is no doubt helpful in his signal processing research with robotic submersibles. Zhang started his underwater studies in his native China, receiving an M.S. in underwater acoustics engineering at Northwestern Polytechnic University in Shaanxi province. Seeking a more extensive mix of theoretical and practical research, he headed to the University of Washington for a year, and then transferred to MIT in 1995. Since his arrival, Zhang has been working with MIT Sea Grant's Autonomous Underwater Vehicles (AUV) Lab. Having completed his double master's degrees in electrical engineering and computer science and oceanographic engineering in 1998, Zhang is now a Ph.D. candidate in the MIT/WHOI Joint Program. Under advisors Art Baggeroer (Ford Professor of Ocean Engineering) and Jim Bellingham (MIT Sea Grant AUV Lab principal research engineer), Zhang's signal processing research focuses on taking raw information and making it useful. What exactly does that mean? "Let's say you have a good transistor radio and a bad one," he says. "Why is a good one better? Because it filters out more noise."

Specifically, Zhang has been figuring out ways to perfect signal processing with the AUV Odyssey. In 1996, Zhang was part of the AUV Lab team that went to Haro Strait, off the coast of Washington, to study the vigorous mixing along tidal fronts. He expanded on that work a year later using another kind of Doppler sonar, which provides a higher level of precision. The findings from that novel research earned him awards at the 1997 International Symposium on Unmanned, Untethered Submersible Technology and from the American Society of Mechanical Engineers/Ocean Engineering Division in 1998.

Thus far, Zhang has participated in four field cruises. Along with learning that he isn't prone to seasickness, he says those missions also taught him a few practical lessons. "I learned about planning priorities, about gaining as much raw data as possible, and about how to work as a team."

With a reputation for working hard and late, Zhang seems surprised when queried about what else he likes to do. "A year ago I played badminton," he offers. "I enjoy listening to Peking Opera. And I love to walk in Killian Court," he notes, referring to MIT's vast, green lawn. "When I look at the dome, I find motivation and encouragement there."

Such inspiration should help as dissertation time nears. Zhang expects to receive his Ph.D. in 2000 and looks forward to continuing his research in ocean engineering and signal processing.

**-Andrea Cohen, MIT Sea Grant**