Wearing Multiple Hats

At the University of Minnesota, Daniel Keefe and Marc Swackhamer are members of MINN LAB, a trans-disciplinary collective that creates urban site-specific installations combining scientific visualization, architecture, design and landscape architecture.

At MINN LAB, a trans-disciplinary design collective at the University of Minnesota (UMN), no one wears just one hat. Pluralistic approaches reign supreme. Architects pool their creative resources with computer scientists and designers swap ideas with landscape architects. As a collective, the group collaborates to produce site-specific urban installations combining a variety of design perspectives with data visualization and user interaction. A glorious sense of post-compartamentalism tends to drive all projects.

“We have a very diverse group of people,” says Marc Swackhamer, a MINN LAB member who also heads the UMN School of Architecture. “We tend to graze off many different interests.”

As result of MINN LAB projects, professors and their students get their feet wet in areas they don’t normally experience. A programmer might acquire some welding chops or an architecture undergrad might learn about scientific visualization and research methodology. Collaborators come away with brand new hats they’ve never before donned.

“MINN LAB has made it possible for me to do physical, hands-on work that is visible within the local community and to do this at a scale that would simply be impossible on my own,” says Dan Keefe, an Associate Professor in the Department of Computer Science and Engineering at UMN.

Keefe’s first project with the MINN LAB team was Weather Report, a gargantuan public installation for the 2016 incarnation of Northern Spark, an annual all-night art festival that lights up the Twin Cities area. Installed along the Mississippi River next to the Stone Arch Bridge in Minneapolis, Weather Report featured 864 luminous balloons functioning as pixels, all displaying 60 years of local weather data, resulting both from classical measurements and live human interaction with the installation. The cover image and Figure 1 are from the installation. Keefe writes about the project for this issue’s Art on Graphics department.

“The physical presence of this piece was something I had never experienced before in my own work,” Keefe says. “It has affected my scientific research by inspiring a new focus on what the visualization research community is now calling ‘data physicalization’—physical forms of data visualization.”

Even though Keefe’s academic training and credentials are in computer science, his background in visual arts always inspired his approach to computing. While studying both oil painting and computer engineering at Tufts University, he took a summer internship at NASA Langley’s Data Visualization and Animation Lab where he realized that computers could help him create visuals that were impossible to perceive in any other analog medium.
Figure 1. A view of the *Weather Report* project in which balloons are illuminated to represent weather phenomenon. Photo courtesy of Daniel Keefe (used with permission).

What’s more, Keefe’s experience in collaborative situations also helped him in the long-run. In grad school at Brown University, he collaborated with the Rhode Island School of Design, and his dissertation was about how artists and scientists can work together to create more effective scientific visualizations. All of which made him a prime choice for MINN LAB.

“I have carried this theme with me to the University of Minnesota, where my computer science students and I collaborate regularly with artists and designers in addition to scientists, engineers, and doctors,” Keefe says. “The UMN Digital Design Center has been a catalyst for these types of collaborations, and this is where I met Professor of Architecture, Marc Swackhamer, who brought me into the MINN LAB team.”

**WORKING WITH VISIONARIES**

A collaboration works best when everyone respects the processes and perspectives of the other participants. Even if artists and scientists assume they won’t normally operate on the same plane of existence, when collaborators are willing to acquire new skillsets, wondrous things can happen. Creative people will influence each other in ways they never expected. Computer science students become better researchers by learning more about visual art, while artists learn more about scientific concepts and how to think like scientists.

“You need to work with visionaries,” Keefe says, adding that he prefers a model where people learn to wear multiple hats over time and nobody is stuck in the past. “My MINN LAB collaborators are visionaries. Like any interdisciplinary team, there is a startup cost, the group needs to create a Rosetta Stone to translate the language and goals of each discipline, but then the challenges that arise are the same as with any group of engaged creative people, mostly that there are too many good ideas and not enough time.”

Swackhamer recalls a meeting during the preparations for the *Weather Report* project. Everyone had different ideas about how the balloons could visualize data with nuances of color. Collaborators bounced ideas off each other in ping-pong fashion, with architects, designers, and computer scientists seemingly learning each other’s language in the process.

“As architects, we do research to a degree, but we’re not researchers by trade,” Swackhamer says. “Whereas Dan brought a rigor to the process that we didn’t have otherwise. He also brought a scientific background in color perception, the ways that people perceive color.”
CONCLUSION

MINN_LAB continues to move forward. Another project, “Orbacles” (see Figure 2), won the 2017 Creative City Challenge, a trans-disciplinary competition for Minnesota-resident artists and scientists to create a temporary site-specific installation for two months during Northern Spark. A trio of orbs presented the stories, histories, and future projections of bird species in the Twin Cities area, including species loss, anticipated shifts in species migration due to climate change, and how those processes are inseparable from land and water ecosystems. The orbs were constructed of 147 different modules representing 147 different species of birds. The modules varied in color, using data to visualize the past, present and future of how the species will remain or evolve away from Minneapolis.

Keefe is also currently collaborating with artist Francesca Samsel on a new NSF-supported project called “Sculpting Visualizations,” in which he wants to make scientific visualization even more accessible to artists.

“I’m increasingly interested in ‘data physicalization’ and tangible computing in general,” he says. “I want to find new ways to blur the boundaries between the immersive interactive experiences possible in virtual reality with the experiences we have in the real world every day.”

ABOUT THE AUTHOR

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