



PROFILE

Robert J. Lang

Physicist Robert J. Lang applied math to his childhood hobby and created origami of unprecedented complexity. He then discovered that its value to science is incalculable

STORY James Malcolmson PHOTOGRAPHS Adrian Gaut

In early 2000, Robert J. Lang, a respected laser physicist at JDS Uniphase, the Silicon Valley-based optical networking company, decided to tender his resignation in favor of an entirely new career path as a full-time specialist in the Japanese art of origami. What some might view as a precipitous lurch toward frivolity was anything but. Lang had already established himself as one of the leading western practitioners of origami, at the forefront of a renaissance that has taken the art far beyond its roots.

Japanese origami had been practiced for hundreds of years, but it wasn't until the late 1950s and '60s that it advanced from basic designs, such as the ubiquitous crane, thanks to the work of Akira Yoshizawa, who toiled away for years in obscurity. Yoshizawa is widely considered the father of modern origami, and his techniques, like "wet folding" with precise amounts of carefully applied water, enabled an entirely new range of rigidity and curves.

Lang by contrast began practicing from the age of six on a diet of cookbook-style literature that was one of the few windows on origami in the west. Although Lang admired Yoshizawa's work, a fellow American Neal Elias, who answered Lang's correspondence and freely shared his techniques, proved to be a more profound influence.

"The mathematical concepts within [his creations] were evident in the designs," Lang recalls. "I could generalize those ideas and do much more complex figures. It was a huge advance." By the late 1980s, Lang, now in graduate school, began to receive notice for his own work. A series of "action origami"

cuckoo clocks – pulling the pendulum opened the door to reveal the bird inside – prompted an invitation to a Japanese origami symposium, the first ever to be issued to a westerner.

When he accepted the invitation in 1992, Lang was working on a set of ideas that went beyond the already complex techniques he'd absorbed from Elias. Perhaps naturally, he found a strong connection to his scientific work. "In lasers you create a mathematical model to give you design directions," he says. "I felt like you could use similar systems in origami, because there are always natural laws at work." Just as he had projected the behavior of photons and electrons in lasers and semiconductors, he now began to plot the locations of circles and "rivers" of constant width that would become the form and features of his creations.

A far more complex figure than could be devised by intuition alone would need to be placed on a single sheet of paper. And so complex were most of the patterns that they defied conventional, step-by-step folding. Instead, most of the major folds needed to be pre-creased and the whole figure pulled together in an operation Lang and his peers term "the collapse." Not only did the artist have to perform this with considerable dexterity but with the ability to visualize the final product as it comes together from a series of seemingly unrelated shapes. By the mid 1990s Lang had codified his ideas into formulae that could be adapted to computer design programs and shared with other "folders," as fellow artists are known within the tight origami community.

Lang clearly treasures the collegiality and insists his work was not performed in a vacuum. At his home in northern California, pride of place goes not to his own creations but to those of his contemporaries. These include the Vietnamese minimalist Giang Dinh, who uses surprisingly few folds, and the late French artist Éric Joisel, whose human and animal figures are astonishingly expressive. Lang's own work sits almost unobtrusively on a set of shelves in his cluttered studio. His oeuvre impresses not just with its complexity but in the range of styles he has mastered. A variety of small-scale arthropods (an almost life-sized pteranodon resides in a Montreal museum) speaks to his interest in natural subjects; abstract geometric designs are executed in materials such as metal-backed wood veneer.

Lang's Silicon Valley background has made him a go-to collaborator for real-world applications of the art. In conjunction with various academic institutions he has used his expertise to help design complex solar arrays for spacecraft that make optimum use of precious space when stowed. Through him, origami has found its way into even more unusual ideas, from folding cardboard liquid containers to furniture, even to a folding substrate for an artificial liver.

Lang's career has become associated with profound complexity, yet his fundamental notion of origami remains tied closely to aesthetics. "We have moved so far from traditional designs – so far you might question whether it's still called origami." ♦ For more on this subject, visit Patek Philippe Magazine Extra at patek.com/owners



Galapagos Tortoise, opus 683 (below right); Colleen Pot, opus 589 (below left); The Sentinel II, opus 627 (above left) all designed by Robert J. Lang. Many "folders" have collaborated to develop modern origami. Polypouch (above right) was designed by Chris K. Palmer and folded by Lang



ADDITIONAL PHOTOGRAPH: ROBERT J. LANG THE SENTINEL II, OPUS 627