

HONEST OUTREACH: IMMERSIVE EDUCATION FOR EVERYONE



Mission

Teach and explain what we know and discover – without dumbing down, but instead reducing to minimal essence – to students in grade school, middle school, high school, and to the general public.

Inspiration

Why should we expend the immense effort it will take to teach very sophisticated ideas to such an incredibly broad audience? There are **at least five** reasons:

- 💡 **THEY FUND THIS WORK:** Those we teach make our work possible, as it is funded by state and federal funds.
- 💡 **THE OPPORTUNITY TO ENRICH LIVES:** Sharing our knowledge will positively impact their lives in new ways.
- 💡 **BECOMING CHAMPIONS OF OUR WORK:** Success here will enable us to explain the importance of our work to the public, fostering significant community support for our work and for the university.
- 💡 **DEEPER UNDERSTANDING:** The effort of reducing our work to its essence required to broadly explain it will be rewarded by deeper understanding. Deep insight will will open new paths for exploration.
- 💡 **RECRUITMENT:** Generating excitement for our research in a broad community will lead to significant recruitment opportunities.

Goals

- 💡 **EXPLAIN DEEP IDEAS** in mathematics, physics, engineering, etc. to students in grade school using all the tools at our disposal. The key, and unique approach we advocate, is to distill our research to its simplest essence while remaining faithful to the concepts.
- 💡 **USE ART AND DESIGN** in creative and original ways communicate our ideas through all channels of human experience. Our goal is to engage multiple aspects of human perception to make deep intellectual concepts instinctive. This will allow people to develop an intuitive understanding of these concepts that they can usefully apply.

*No broken analogies.
Instead, faithful
visualization.*

🔗 **PROVIDE IMMERSIVE EXPERIENCES** with interactive “makerspaces” in which participants can actively explore and experiment with real data and applications.

🔗 **INSPIRE STUDENTS** to explore intellectual ideas, interacting with a broad community of experts to open doors to rich career opportunities.

Initial Plan

🔗 **FIND THREE GROUPS TO TEACH:** Initially this will probably include:

- a grade school class in Pullman,
- a high school class in a less privileged community,
- general public in Pullman, Moscow, and Spokane.

Customize different modes for each: i.e. classroom visits, summer workshops, and lecture/discussion experiences.

🔗 **CREATE OUTREACH MATERIALS** in agile jam sessions that rapidly iterate and experiment with different techniques. Effectiveness of these approaches will first be validated with the broad range of perspective and expertise comprised by the Complexity, Data, and Learning Group (CDLG), then feedback will be solicited from the broader community. Materials will include videos, physical demonstrations, computational labs, open-lab/drop in times, notes, and carefully crafted problem sets that guide exploration. Create an experimental component based on Red Stong’s old “Amateur Scientist” column [1].

🔗 **FOLLOW THROUGH** with everyone who wants to go deeper. Every opportunity will be made to provide means to further exploration for those who have passion but lack resources.

🔗 **TOPICS:** We will start with the following themes that are central to the research and teaching interested of invested members of the CDLG:

- Geometric analysis and dynamical systems.
- Quantum mechanics and computation.
- Relativity.
- Statistical mechanics in everyday life.
- Game theory and mathematical economics.
- Data analysis, machine learning, and optimization.
- Art and design.

See mesoscale urban dynamics whitepaper.

Bibliography

[1] C. L. Stong, Sci. Am. **232**, 118 (1975), URL <https://www.jstor.org/stable/24949712>.