

## NanoTeach: Professional Development in Nanoscale Science

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Mid-continent Research for Education and Learning along with ASPEN Associates, Stanford Nanofabrication Facility, and the National Nanotechnology Infrastructure Network (NNIN) are developing *NanoTeach*. The project is developing and testing professional development that combines an **instructional design framework** with **nanoscale science content** using **multiple delivery methods** for high school science teachers. The project has two research questions:

**RQ #1** Does the *NanoTeach* facilitated professional development improve teachers' ability to integrate NS&T content into their classes in a way that promotes effective science teaching?

**RQ #2** To what extent is the approach utilized in the *NanoTeach* project a viable approach to the development of professional development materials and experiences that support integration of nanoscale science in high school science?

**Methods:** The research design includes a formal pilot test and field test with random assignment treatment and control groups. The *NanoTeach Teacher's Guide* will be designed for self-study (control group) and for use in a facilitated (80 hours plus significant follow-up) professional development model (treatment group). The results of the pilot test will inform revisions to *NanoTeach* prior to the field test. The research design and evaluation include ongoing structured data collection and reporting to support the development team in formal reflection about the viability of the design process and the quality of the resulting products.

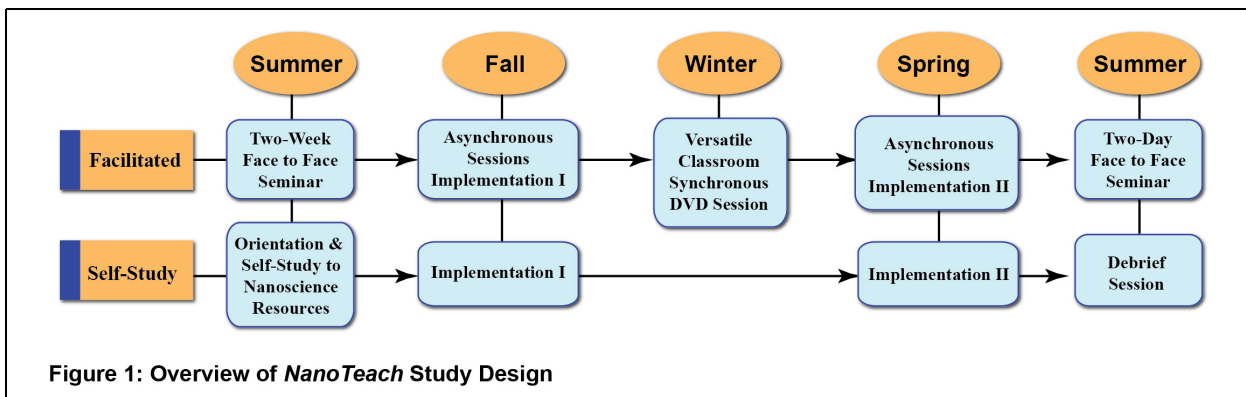
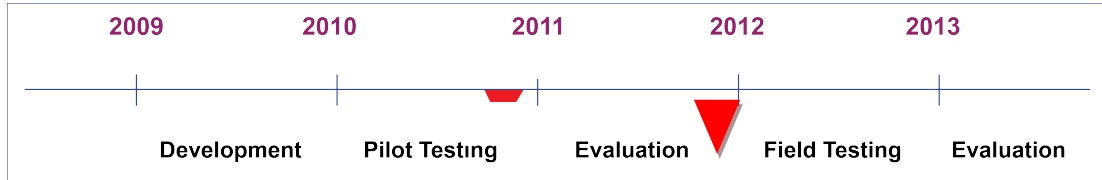


Figure 1: Overview of *NanoTeach* Study Design

**Intellectual Merit:** *NanoTeach* builds on the significant investments that the NSF has made in NS&T and on the existing findings and resources generated from these projects, including *NanoLeap*, *NanoSense*, and the *NanoEd Resource Portal* at the National Center for Teaching and Learning in Nanoscale Science and Engineering (NCLT). *NanoTeach* will test both self-guided and facilitated professional development and advance the field by studying how a carefully designed framework can help teachers learn NS&T content and integrate this content into existing curricula in a way that is essential to meeting their local curricular goals. While bringing current, cutting edge science into K-12 classrooms, *NanoTeach* also tests a cyber enabled learning tool (*Versatile Classroom*) to deliver high quality video in real time as part of distance-learning professional development for teachers.

**Broader Impact:** *NanoTeach* will significantly contribute to the pool of teachers trained in NS&T, reaching over 200 teachers directly and preparing them not only to teach NS&T but also to become ambassadors and mentors for teaching NS&T in high school classrooms. The project targets teachers from in and around large urban centers who teach traditionally under-represented groups and helps them form a learning community that includes NS&T scientists, researchers, and educators, as well as K-12 teachers. Following the study, the *NanoTeach* professional development model will be widely disseminated through the cadre of participating teachers and the project partners' national networks, including NSTA, NCLT, and NNIN. The successful demonstration of the *Versatile Classroom* as a vehicle for professional development will engage teachers in lifelong learning and improve their practice in a timely and inexpensive manner.



## References

[1] For further information about this project link to <http://www.mcrel.org/nanoteach/>