



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP140103

Project Title:
Collaborative Training of a New Cadre of Innovative Cancer Prevention
Researchers

Award Mechanism:
Research Training Award Continuation Grants for Years 4 and 5

Principal Investigator:
Ness, Roberta

Entity:
The University of Texas Health Science Center at Houston

Lay Summary:

Just a few years ago, a page 1 NY Times article, *Forty Years' War: Grant system leads cancer researchers to play it safe*, took scientists to task for achieving so little in the war on cancer. Why? Lack of innovation: "One major impediment, scientists agree, is the grant system itself...[focused] on small projects unlikely to take significant steps toward curing cancer. The institute's reviewers...are timid about taking chances on [projects]...that might not succeed."¹ Training programs focus on "me too" science; indeed, standard advice to trainees is to carve out a small question close to their mentor's theme. We believe that to expedite cancer prevention, we must train students to challenge and break out of current research and practice paradigms. The next generation must learn methods of innovative thinking that employ a variety of tools developed by cognitive scientists, linguists, and educators. Oddly, given the imperative for innovation in science, these tools (although widely applied in business)² are not generally taught in science.³ The cancer prevention research training program we have designed is not only new, but to our knowledge it is entirely unique in Texas and beyond. Our program focuses squarely on innovative thinking and the pursuit by pre- and post-doctoral trainees of highly creative projects that are designed not to simply baby-step science forward but to employ bold imaginative leaps. Innovation is maximized at interdisciplinary interfaces. We have mobilized research and training expertise from the UTHHealth School of Public Health (SPH), School of Biomedical Informatics (SBMI), Graduate School of Biomedical Sciences (GSBS), Medical School, and MD Anderson Prevention Sciences Division, enriched by the innovative interdisciplinary research at the Institute for Molecular Medicine. Each partner adds unique and synergistic capabilities.

- SPH offers graduate population sciences training with a statewide regional campus system, facilities for distance education and intercampus research, and networks of public health practitioners and community-based organizations
- SBMI brings internationally recognized expertise in cognitive sciences (e.g., human-computer interaction), biomedical modeling and simulation, taxonomy and ontology research in cancer prevention, and public health informatics (e.g. spatiotemporal analysis)
- GSBS provides outstanding training and "breadth" in basic cancer biology, molecular biology of genes and cancer development, molecular epidemiology of gene-environmental interactions, and molecular virology. Its research programs focus on host and environmental (e.g., viruses, tobacco, chemicals) biomarkers for cancer development
- MDACC Prevention Sciences Division has a wealth of data resources in its extensive and

diverse patient population and its previously collected, well-characterized registries and study populations. Achievements of our pre- and postdocs in Yrs 1-3 exceed those we have seen in other training settings expressed in usual academic metrics—publications, funding, awards, and faculty positions/postdocs. Even more exciting is the novelty of their ideas and the extent to which they incorporate the tools of innovative thinking into their “normal” science.” 10% are from underrepresented groups. Further, we introduced 58 undergrads, from 22 US colleges & universities-->1/3 underrepresented/disadvantaged groups--to innovative thinking, population health & health informatics through our summer research program in Houston, Austin, El Paso. To implement our unique innovative training, we have enlisted a broad portfolio of methods - coursework, workshops, mentoring, guided practice, and a wealth of research opportunities--to prepare pre- and postdocs in core competencies, with individualized plans. Key elements are

- Training for trainees & mentors in evidence-based innovative thinking skills by Dr. Ness, PI, UTHealth VP for Innovation, innovative cancer epidemiologist, academic leader, with 4 books on innovation
- Multifaceted mentoring, with a mentor provocateur to support innovation, eg, matching a cognitive science SBMI predoc with an SPH network analyst to analyze the content and interaction of smokers on a cessation support website
- Career skills development & research ethics

through an Integrative Seminar focused on proposals & manuscripts, interdisciplinary communication, and oral presentation skills led by Dr. Mullen (Co-PI) with 2 decades experience running successful training grants. •An environment supportive of innovation, established by the PIs, Training Coordinators, and Executive Committee that evaluates pre- and postdoc projects and performance. In Yrs 4-5, we will train 9 predocs, 6 postdocs, and craft internships for 40 undergrads to capture at an appropriate level, the skills, excitement, and exposure of the overall Program, with placements in population sciences and biomedical informatics projects in Houston, Austin, and on the Border.