

## Editorial

### Priorities in indoor environmental science and health, as students see them

In a recent *Indoor Air* editorial (Volume 19, Issue 4, 2009), editor Jan Sundell wrote ‘*Indoor Air as a journal, as well as indoor air as a science, will die unless we start to co-operate, as Indoor Air and the society behind it, ISIAQ, are all about multidisciplinary science!*’ How dire! Whether we consider deleterious effects in complex modern buildings or in rudimentary indoor systems in the developing world, indoor environments are fraught with human health hazards. Our highest goal, then, should not be to recruit lifelong indoor environmental scientists and engineers, but rather to clearly define human health challenges that take root in indoor environments and engage the expertise of teams and individuals from relevant disciplines to address them.

Thus, while agreeing with Sundell’s quote, we propose an alternate diction: ‘*Indoor environmental science and health research will flourish and progress when members from multiple disciplines collaborate and work toward common goals.*’ Multiple disciplines cannot force common goals, yet solutions to problems in our field naturally encourage collaboration. The research questions in our field benefit from the inclusion of specialists from many disciplines, even if they do not focus entirely on indoor environments. Perhaps our field would further prosper by outcome-driven projects relying on many different outside specialists who would come to know the nature of our work in bits and pieces, rather than by convincing a few small groups of researchers to devote their careers to indoor environmental studies.

In July 2009, with these collaborative goals in mind, we, the student members of a National Science Foundation (NSF) Integrative Graduate Education and Research Traineeship (IGERT) program in Indoor Environmental Science and Engineering at the University of Texas at Austin gathered to discuss research priorities in our field and to highlight some impending grand challenges we face as emerging indoor environmental scientists, but also as members of a larger, environmentally concerned scientific community. We produced the following list of priorities from a novel, and previously unpublished, perspective: that of students.

- Develop and implement cost-effective air pollutant control strategies for new and existing buildings that reduce exposure to pollutants and lower by-product formation from chemical reactions without compromising energy consumption in buildings.

- Anticipate, assess, and address threats to indoor environmental quality (IEQ) that may result as communities develop more densely populated, mixed-use, walkable and transit-served neighborhoods.
- Engage with policy-makers to establish, enforce, and evaluate codes and voluntary guidelines that enable practitioners and occupants to create and sustain healthy, comfortable, productive, and energy-efficient indoor environments.
- Develop and promote exposure and risk assessment practices, using quantifiable physiological metrics that include the potential compound and cumulative health effects from exposure to multiple pollutants, including those emitted by traditional and green building materials.
- Commit to improve IEQ for vulnerable populations lacking political and economic power while recognizing that communities deserve context sensitive solutions since needs vary across nations, regions, and socioeconomic status.

Addressing the priorities included here will inevitably lead to transcending the traditional boundaries between disciplines and professions, especially given the emphasis we place on implementation, on-going evaluation, and the needs of vulnerable communities. Our proposed priorities should be read as broad, but certainly not exhaustive, vision statements for an interdisciplinary field: each will require researchable questions developed by specialists working individually and in teams. For instance, we cannot hope to develop effective air pollutant control strategies or risk assessment practices unless we are also (i) investigating novel compounds, often unstable byproducts of chemical reactions, in source fate and transport studies, (ii) linking perceived IEQ studies with toxicological and exposure studies, and (iii) conducting IEQ intervention studies that evaluate occupant behavior and health outcomes alongside changes in indoor chemistry and physics. Whether in the lab or in the field, as practitioners or policy-makers, we find that these broad research goals will help guide us in careers that meaningfully contribute to science and society.

As graduate students in an interdisciplinary program, we are well aware that interdisciplinary

collaboration is rarely *easy*. Yet, these tensions are often productive. We have found that interdisciplinary collaboration toward common goals has the added benefit of opening new areas of research, increasing our efficiency in managing other complex problems, and forging partnerships that can be

employed to address challenges that we have yet to discover.

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