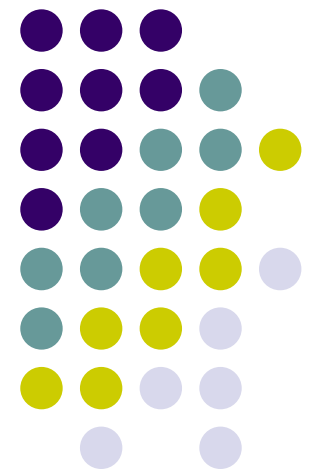


AIR: An Adaptive Strategy for Meeting Ethical Challenges in Nanoscience

Perrin Cohen, Ph.D.
Donna Qualters, Ph.D.

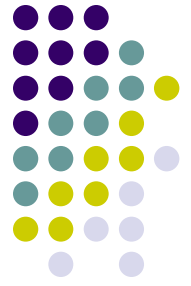
Workshop for Post-Docs, Graduate Students, & Undergraduates
June 23, 2005
1:00pm-5:00 pm
Northeastern University

The Center for High-rate Nanomanufacturing
A National Science Foundation Nanoscale Science and Engineering Center (NSEC)

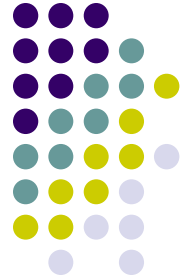


AIR Workshop Goals:

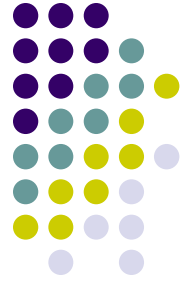
By the end of the workshop, participants will be able to:



- Have an increased awareness of ethical challenges regarding harm, disrespect, unfairness and dishonesty that Nanoscience researchers and engineers face.
- Better understand your current way of managing ethical dilemmas in your research and workplace.
- Be familiar with the AIR model as a ethical strategy for avoiding damage to reputation, morale, productivity, etc.
- Practice applying AIR to “real life” scenarios



Pre-Assessment Survey

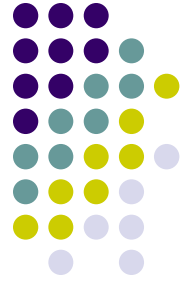


Why Are We Here?

**Take a minute to jot down your reflections
on the following:**

- 1. What ethical risks first comes to mind when you think about Nanoscience research and technology?***
- 2. What does “reflective ethical inquiry” mean to YOU?***

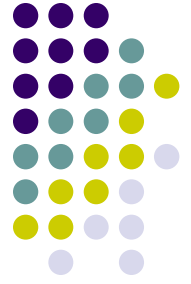
Nanoscience Benefits Social/Personal Realm



Research is finding that:

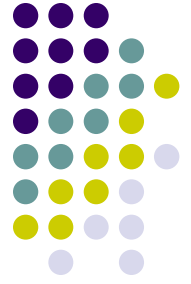
- Greatest benefits are in the health arena
- Second greatest benefit is in environmental cleanup
- More knowledgeable and sophisticated people are about Nanoscience the more they view it as beneficial

Ethical Risks: Societal/Personal realms



- Science Fiction: Prey-like robots
- Economic: distrust of business leaders to protect society
- Military: arms race will accelerate
- Personal: loss of privacy
- Health: breathing particles; using products who long term effects are unknown

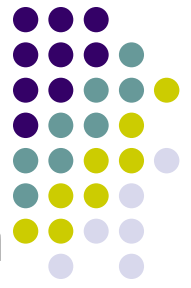
Wow – Yuck reaction!



- Power of nanotechnology allow it “to push beyond the boundaries that society deem acceptable”
 - Genetically modified food – Frankenfoods
- Bill Joy of Microsystems – convergence of Nanoscience, Artificial Intelligence, and biotech could pose a mortal threat

Ethical Risks: Research Realm

Research Misconduct: Reputation of science is being called into question

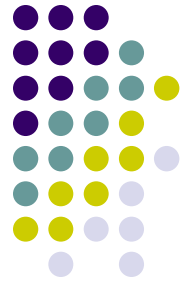


- 3000 scientists – **1/3** acknowledged engaging in one of ten behaviors in the past three years that were potentially sanctionable by compliance officers
 - Overlooking others use of flawed data
 - Changing design and methodology in response to funding source pressure
 - Failing to present contradictory data
 - Circumventing minor aspects of human subject requirements

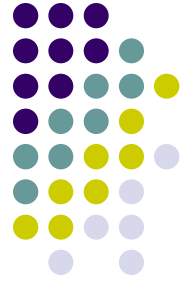
(Martinson, Anderson & deVries, 2005)

Reflective Ethical Inquiry

IS NOT:



- Imposing personal ethical positions and behaviors
- Promoting a theoretical set of behaviors
- Defending one's ethical position/ Deriding another's ethical views
- Reacting to an ethical issue



Ethical inquiry is:

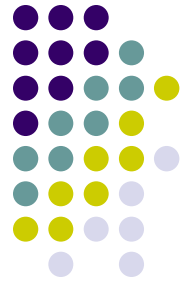
- **the (interdisciplinary) process of approaching ethical issues in a reflective, thoughtful manner**
- **so as to utilize one's ethical frame to make more caring, compassionate decisions.**
- **Ethical inquiry enhances awareness and sensitivity, clarifies and refines ethical thinking and decision making**
- **and transforms ethical decisions into practical responses.**

(Cohen, McDaniels & Qualters, 2005)

GROUND RULES/NORMS



Group Norms That Support Reflective Ethical Thinking

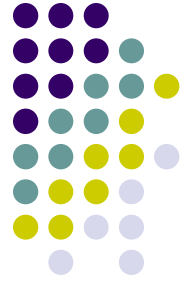


- Confidentiality
- Listening-open hearted, generative, not interrupting
- Be open to learning
- Feel free to ask questions
- Support others to clarify & refine their ethical thinking
- To do so in non-judgmental, respectful way
- Feel free to participate- or not
- Agree to disagree
- Feel free to share opinions

Ethical Concerns of Students



Write down some of the ethical concerns that you've witnessed/experienced in your educational career to date – could include those in the lab, classroom, on coop, any experiential experience!



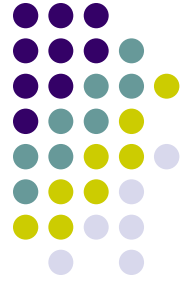
“Gut” Ethical Concerns

How do you currently respond to your “gut” ethical concerns?

Break into small groups and discuss how you would respond to one of those ethical concerns raised b the group

Then write down your response to the concern.

“Reacting to” vs “Reflecting on” Ethical Concerns



Ethical Gut Feelings

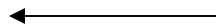
Uneasiness

Disquiet

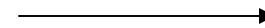
Qualm

Feels “off”

Dis-ease



Reactive Mode



Reflective Mode

REACTIVE

Initial Response

Annoyed

Irritated

Imposed Upon

Helpless

Distracted

Overwhelmed

Self-righteous

Arrogant



REFLECTIVE

Initial Response

“What’s going on here?”

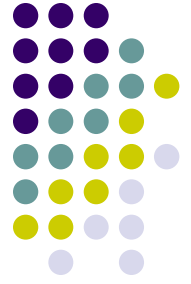
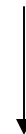
“What are the REAL
underlying ethical
issues?”

How can I better understand
the situation?

What are MY personal
assumptions, biases,
beliefs?

Who will be impacted by my
decision?

(STAKEHOLDERS)



REACTIVE

Default Strategy: Personal
Comfort Zone

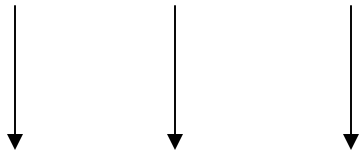
Ignore Avoid

Criticize

Blame

Rationalize

Impulsive Conclusions



REFLECTIVE

AIR Problem Solving
Strategy

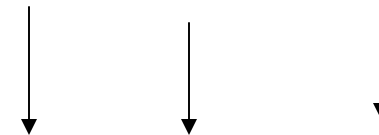
Awareness



Investigation



Response



REACTIVE

Reactive Outcomes

Tuned out to ethical concerns

Mistakes/damage to reputation, morale, environment, productivity, research participants, public

Undermines research outcomes

Undermines technology Outcomes

Undermines ethical thinking

REFLECTIVE

AIR Outcomes

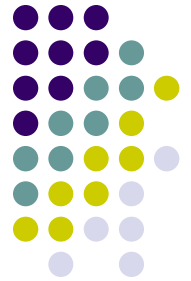
Sensitizes to ethical concern

Protects reputation, morale, environment, productivity, research participants, public

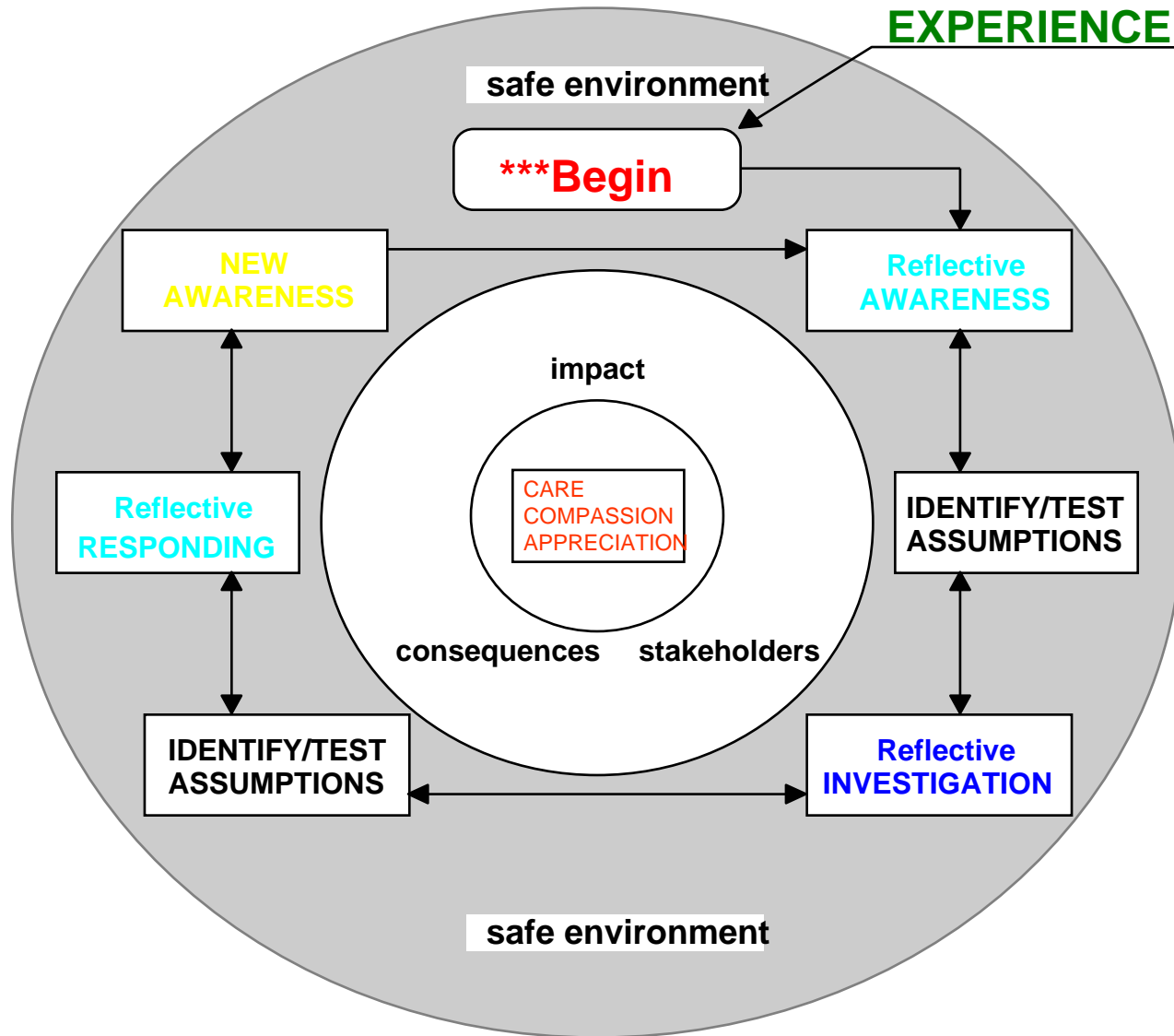
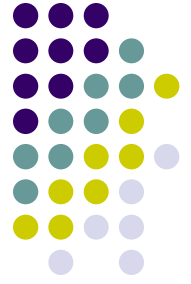
Improves research outcomes

Improves technology outcomes

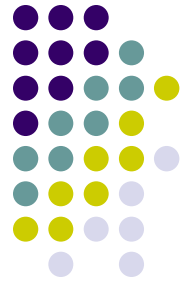
Clarifies ethical thinking



AIR MODEL of Reflective ETHICAL INQUIRY

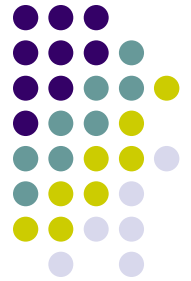


Pedagogical Tools for Promoting Ethical Reflection



- When reflecting on an ethical challenge that you encounter:
 - > Describe the context in which it arose
 - > What was your reaction at the time it happened? How did it make you feel?
 - > What was your reaction later? How did it make you feel?
 - > How did other who were present/or who you shared this with respond?
 - > What is the underlying ethical issue?

Reflective (Investigation: Interdisciplinary Resources/Tools



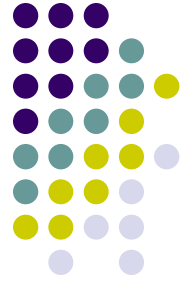
- Ethical Guidelines/Codes
- Ethical Theories & Applications
- Ethics Education
- Professional Ethics
- Natural, Social & Applied Sciences
- Humanities (e.g. literature, poetry, art, music)
- Religious/Spiritual(e.g. text, teachings)
- Law
- Communication skills & theory
- Interview of professionals

Reflective (R)esponding Interdisciplinary Resources & Tools



- Design Innovations (engineering, medical, etc)
- Develop Alternatives (research design, application)
- Educational Innovation (curriculum, teaching)
- Artistic Expression (collage, poetry, music)
- Advocacy (individual, communal)
- Revise and/or Change Career Path
- Self Care (e.g., talking with family/friends, exercise, religious/spiritual practices)

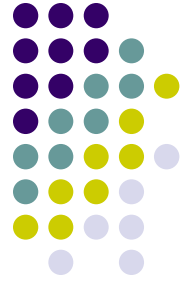
Break Out Groups



- Please go to your assigned group
- Introduce members
- Choose a time keeper
- Briefly read through the scenarios
- Choose one to begin discussion

OR

- Discuss an issue that a group member would like to process
- REMEMBER the ground rules!



Questions?

Post Survey