NOTES FOR GEORGIA TECH PRESIDENT G. WAYNE CLOUGH
AIMS Summit Presidents Panel, September 19, 2006

- Pleased to join my colleagues from Georgia's research universities. (Mike Adams, UGA; Jim Wagner, Emory; Barry Goldstein, provost, MCG)

- Georgia Tech is a relative newcomer to biodesign. Entrance into the world of medicine dates to early 1980s when Tech computer scientists began to collaborate with medical researchers at Emory, working on projects like using early 3-D technologies developed for the movies to produce an animated 3-D computer model of the heart. Then developed a large database of actual clinical cases, so the model could accurately demonstrate effects of various diseases.

- As medicine has advanced over the past two decades, Tech's strengths in computing, engineering, and the sciences have become increasingly important. Today, we are very actively involved in biomedicine and biotechnology; leverage our strengths with complementary partners –Emory, other GRA members.

- Our work tends to be in fundamental research and the development of new techniques, technologies, so is indicative of future directions for practice of medicine:
    - Nanomedicine, especially in the diagnosis and treatment of cancer. Surprise to many to see Georgia Tech among the universities awarded NIH cancer centers. Examples:
        - Nano particles that are designed to attach themselves to cancer cells then release a fluorescent flare that can be detected with imaging technology, so doctors can diagnose cancer and see exactly how extensive it is without cutting the person open.
        - Nanoparticles that carry a pharmaceutical payload – trick cancer cells into absorbing them, then a laser is used to trigger the release of the payload, killing the cell from the inside, so that collateral damage is minimal.
    - Tissue engineering: cell technology, neural applications, skin grafts, bioengineered materials for spinal disc repair, engineering immune acceptance of implants.
    - Medical technology, especially in the area of imaging, sensors. Examples:
        - Next-generation imaging technologies that allow in vivo cellular imaging.
        - Closer at hand: development of low cost, hand-held imaging device that can detect early-stage pressure ulcers, show images of deep tissue injuries.
        - CardioMEMS sensors for heart and circulatory system monitoring.
    - Computer applications to medicine:
        - Bioinformatics: Computer programs that enable manipulation and modeling of the recently completed human genome.
        - Programs for disease diagnosis and treatment. Examples: Manipulating large databases of clinical data to help doctors be more accurate at connecting symptoms with diseases. Using pattern-recognition software to

detect abnormal capillary changes, which often signal early stage of disease.

- Pharmaceuticals
  - CD4 = Center for Drug Design, Development and Delivery: Integrate the multi-step process of drug development to help drug companies bring new products to market. Brings together GT's experience in pharma design with our expertise in complex and demanding chemical engineering required for specialty chemicals. Also connects to work in bioinformatics, proteomics, genetics.
  - GT biologists recently discovered 10 new molecular structures with pharmaceutical potential in a species of red seaweed that lives in the region of the Fiji Islands.
  - Research on how to get cell to briefly open then close cell wall, allowing admittance of therapeutic molecules.
- Personalized medicine – maximizes treatment for individual:
  - Computer algorithms that calculate case-by-case placement of radioactive seeds for maximum effect in treating prostate cancer.
  - Mapping individual's body chemistry – better decision on which medications will be most effective.
- Predictive medicine: Uses genetics, bioinformatics, nanomedicine to develop personalized plan to anticipate and prevent disease in individuals. About to begin major initiative with Emory.
- Creation of effective and efficient health care systems through the application of communication and computer technologies: Health Systems Institute.

- Georgia Tech also brings tech transfer expertise to the table.
  - GT has always been entrepreneurial by personality. Have never been content to develop new technology and simply put it on the shelf; always engaged in putting it to work to make things better. Today, widely recognized for excellence in technology transfer.
    - Southern Growth Policies Board national study, *Innovation U*: "Perhaps more than any other research university in North America, economic development is an integral, critical component of the Georgia Institute of Technology."
    - Connecticut: "Accelerating Economic Development Through University Technology Transfer" chose GT as one of 9 university models nationwide.
    - Advanced Technology Development Center: nation's first university-based business incubator and recognized by a long list of awards as one of its best.
  - Georgia Tech's numbers:
    - 9^{th} in nation in patents last year with 43
    - 2 dozen start up companies in past 2 years

The process:

- VentureLab: Created in 2001 to streamline commercialization process and provide a clear pathway from our research labs (now being copied by GRA and other universities)
- Have expanded VentureLab, taken to next level:
    - Constantly assess commercial potential of discoveries and technologies from GT research labs:
        - Patentability, readiness for market, market size and appeal, potential competition, inventor's interest and ability to be entrepreneur.
        - Develop path to commercialization: funding requirements, regulatory issues, competitive positioning, start-up vs license to existing company.
    - GT's Office of Technology Licensing integrally involved in process.
    - Workshops/seminars for faculty on IP protection, how licensing works, company start-up process, what VC investors look for.
    - Faculty matched with "Fellows" – experienced entrepreneurs who mentor them through the process.
    - Early-stage seed funds for proof-of-concept or product prototype that is needed to attract outside VC funding.
    - Guidance from Advisory Board of entrepreneurs and investors.
    - Since it began in 2001, GT's VentureLab has assessed more than 300 technologies. By its 5-year anniversary in 2006, 11 new companies had been formed through the process.
- Next stage: incubation
    - ATDC:
        - 38 companies in incubation at 5th Street; 6 of them are in biosciences
        - ATDC Biosciences Center: Wet lab incubator in GT's Ford Environmental Science & Technology Building: Unusual to have incubator in research building, but enables faculty and students to collaborate with entrepreneurs – two groups who usually are isolated from each other. Usually half dozen companies in incubation.
    - EmTech Bio: Joint GT/Emory venture that offers lab space and use of scientific equipment to early-stage bioscience companies. Also promotes interaction among companies and offers assistance in developing business skills (attracting VC, doing PR, managing IP).

- Other GT contributors to the process:
    - Georgia Tech Innovation Fund: Allows Tech to take position in start-up companies, provide seed funding to start-up companies.
    - Technology Partnerships: Facilitates GT partnerships focused on IP and R&D around common technology needs. Can be with other universities, companies, government research facilities.

Examples of current GT bioscience start-ups:

- CardioMEMS – tiny sensors for circulatory system that are activated by and send readings using radio waves; quick, cheaper and less collateral damage than CT scans. First sensor has gone through human trials, won FDA approval for market. Others in development.

- Orthonics – develops advanced biomaterials with the ability to promote bone and cartilage growth and adhesion.
- Biofisica – tissue engineering solutions for wound care that mimic the body's natural healing current.
- Tikvah Therapeutics – therapeutics for central nervous system diseases