

Iowa's Engineering Colleges

Building a Better World for All

IOWA STATE UNIVERSITY



UI / ISU VISITS TO ROTARY CLUBS



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Engineering: Building A Better World For All

Driving Economic Development

Nearly \$90 million in combined annual research leading to:

- Safer water supplies
- Advanced materials
- Timely disease detection and treatment
- Fewer highway accidents
- Economy based on renewable agricultural resources

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Engineering: Building A Better World For All

Driving Economic Development

- Breakthrough research
- Talented students
- Productive alumni
- Life-long learning
- Intellectual property
- Start-up companies
- Partnerships with existing companies, regional/state economic groups



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UI-ISU Collaboration

- Biotechnology Byproducts Consortium (BBC)
- Nondestructive Evaluation
- Iowa Space Grant Consortium
- Technical Briefing to General Assembly on Biofuels.

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Engineering: Building A Better World For All

Engineering at UI

- \$360 million in UI research grants/contracts
 - Carnegie I research institution
- \$28.4 million annual engineering research
- All engineering programs have close teaching, research ties with UI's five health sciences colleges on one campus
- 12,000 living alumni
 - Senior executives of Exxon USA, Union Carbide, Deere & Co., Rockwell Collins, Square D

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Research at UI

Improving Health

- Cardiovascular, pulmonary imaging
- Institute of Medical Imaging
- Center for Bioinformatics and Computational Biology
- VIDA Diagnostics, BIO::NEOS “new economy” industry

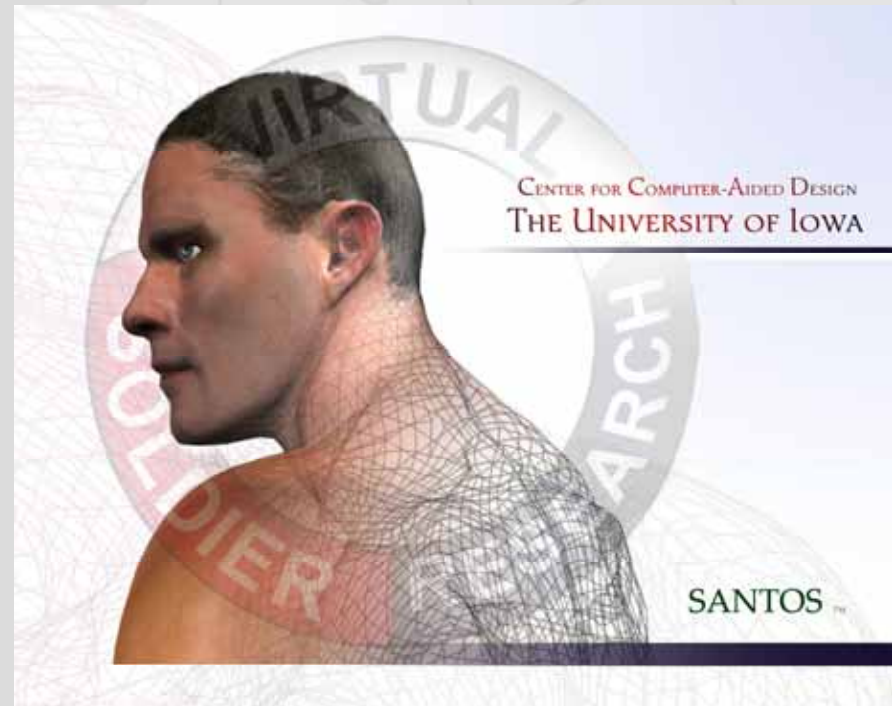
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Research at UI

The “Virtual Human”

- Create human-like life on computer
- Feedback without building prototypes
- \$9.5 million funding—U.S. Army, Caterpillar, Rockwell Collins
- 33 interdisciplinary researchers
- Example: Documenting muscle activation requirements



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Research at UI

Driver Behavior

- National Advanced Driving Simulator
- Human behavior a factor in 90% of crashes
- Research on:
 - Fatigue, aging, medical conditions
 - Safer highways
 - No vehicle prototypes
- 8 different simulators at UI

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Research at UI

Safer Water

- Study pesticides, drugs, cosmetics, industrial pollutants
- Identified volatility of PCBs, synthetic fragrances, fluorinated coatings
- Reduced agrichemical toxins in groundwater with poplar trees



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Engineering at ISU

- Nearly \$230 million in ISU research grants/contracts
- \$59 million annual engineering research
- Second in the nation in R&D 100 awards, fifth in patents, 12th in start-up companies
- Over 39,000 alumni; 8,500 in Iowa
 - Senior executives of 3M, Boeing, Hon, Lockheed Martin, Texas Instruments
 - Inventors of “smart card” technology, encoding process for FAX machines, first electronic computer

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Research at ISU: INNOVATION

Timely Innovations

- Single-dose vaccines
- Gene therapy
- Early disease detection
- Fuel cell catalysts
- High-performance materials
 - \$600K in new funding
 - NASA, Eastman Chemical, 3M
- High Performance Computing and BlueGene Computer



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Research at ISU: Bioeconomy



New Uses for Crops

- Bioeconomy Initiative
 - 50 faculty, researchers
 - Over \$15 million external funding
- Pharmaceuticals from corn
- Plastics from soybeans
- Fuels from switchgrass

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Research at ISU: ELECTRICAL SCIENCES

- Information Infrastructure Institute
 - 30 faculty from four colleges
 - \$2 million external funding
 - High-performance computing
 - Security and software design
- Wireless sensors
 - Measure heat, motion, soil, etc.
 - Monitor hospital patients
- Electric grids
 - Ensure reliable, economic, and efficient flow of electricity
 - Monitor transportation, water, communication systems

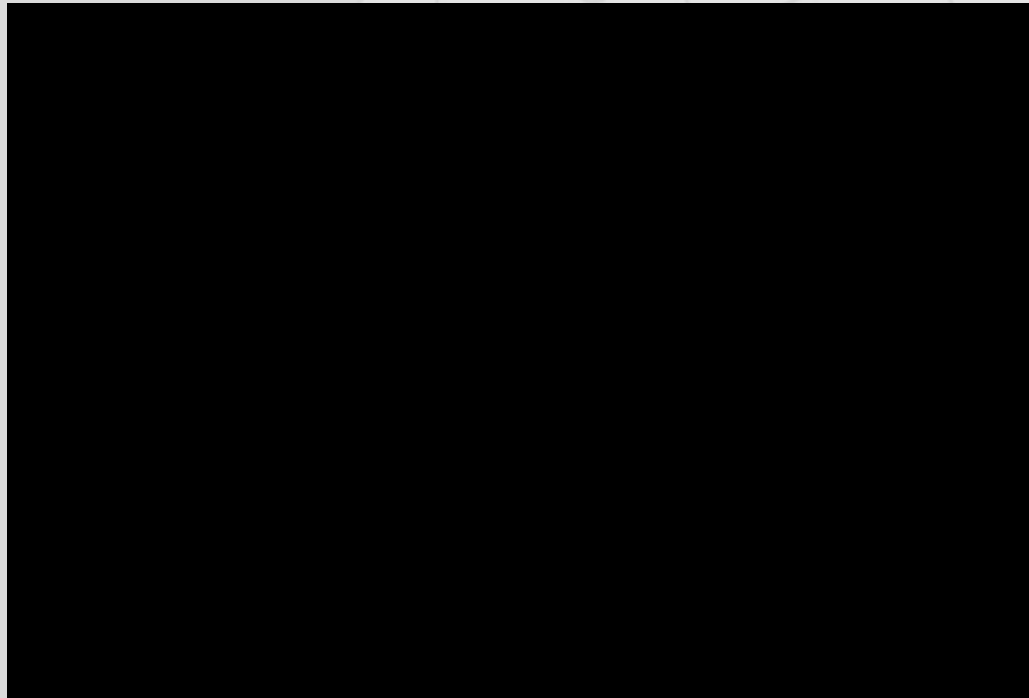


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Research at ISU: VIRTUAL REALITY

Human-Computer Interaction

- \$15 million in ongoing research activity
- Unmanned aircraft
 - \$3 million from DoD
- Vehicle simulations
- Studies of human factors, ergonomics
- Virtual prototyping, assembly methods



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GLOBAL COMPETITIVENESS



— Council on Competitiveness. 2004. *Innovate America: Thriving in a World of Challenge and Change*. National Innovation Initiative Report.

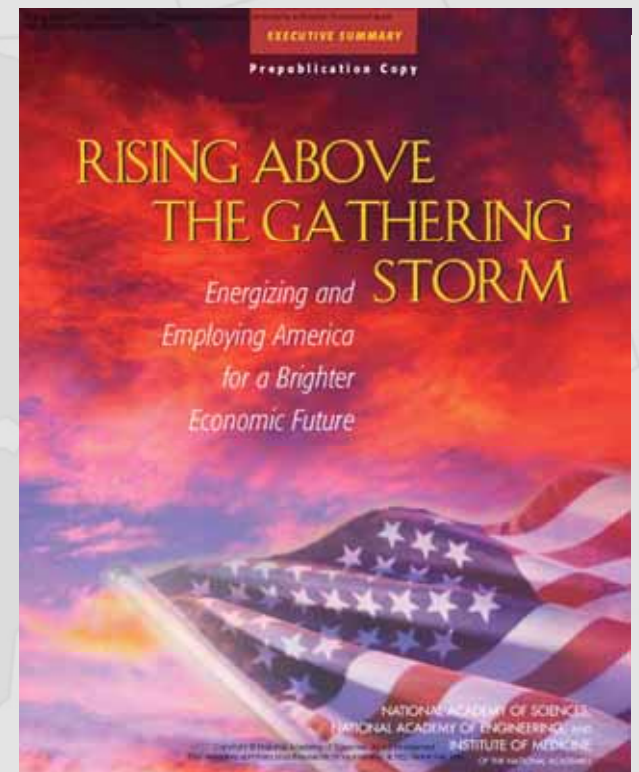
“Innovation will be the single most important factor in determining America’s success through the 21st century.”

- ***Talent: Human Dimension*** (education, knowledge creation)
- ***Investment: Financial Dimension*** (R&D, incentives, venture)
- ***Infrastructure: Physical and Policy Structures*** (structures for collaboration among stakeholders)

<http://www.compete.org/nii/>

“Rising Above The Gathering Storm”

- National of Academy of Engineering Report Requested by Congress.
- How do we remain nationally competitive in a flat world?
 - Increase America’s talent pool by vastly improving K-12 STEM.
 - Sustain and strengthen the nation’s traditional commitment to long-term basic research.
 - Make the US the most attractive setting in which to study and perform research.
 - Ensure that the US is the premier place in the world to innovate.
- Basis of “American Competitiveness Initiative”



INNOVATION AND IOWA'S UNIVERSITIES

- Technology and innovation will revolutionize economic development in Iowa as they have elsewhere in the country.
- Universities, through technology development and transfer, educating a high tech workforce and entrepreneurship, are seeds for economic development.
 - Stanford/Berkeley → Silicon Valley
 - U of Texas → Silicon Hills
- Iowa State University / University of Iowa → 21st Century Economy*
- Iowa has the potential to create a 21st century economy by deliberate investments into its universities as a source of innovation.
 - University-federal-private partnerships to attract high tech enterprises.
 - Reverse the “brain drain” by becoming a destination for the highly educated.

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Engineering: Building A Better World For All

Final Thoughts

- Technology is key driver of economic development
- Technology is advanced by university/business/industry partnerships
- Your help is needed to advocate engineering as a prime solution for strong economic development

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