



Kean University and New Jersey Center for Science, Technology & Mathematics

PRESENTATION TO THE CLEAN AIR COUNCIL OF NJ

MARCH 14, 2018

Welcome to Kean University - NJ Center for Science, Technology & Mathematics

March is STEM month in New Jersey

March 14th is π day

Stephen Hawking has died at age 76 (Jan 08, 1942 - Mar 14, 2018)

ABOUT KEAN UNIVERSITY



Kean University founded in 1855 as a teachers college



The most affordable comprehensive university in New Jersey



7 colleges, offer 52 majors and 35 degree programs



One of the most diverse student populations in the nation



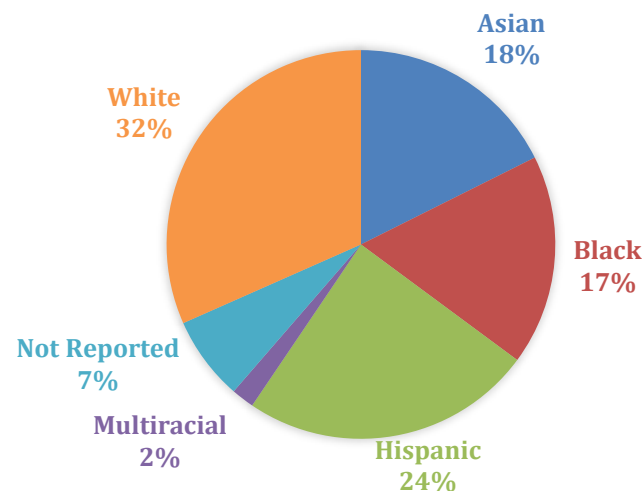
21% are 1st time college students



Average class size is 21

Year	In-State Tuition	Room & Board, Other Expenses
2017-2018	\$12,166	\$15,770

KEAN UNIVERSITY STUDENT DIVERSITY



NJCSTM

New Jersey Center for
Science, Technology & Mathematics

Kean University



Ocean, NJ

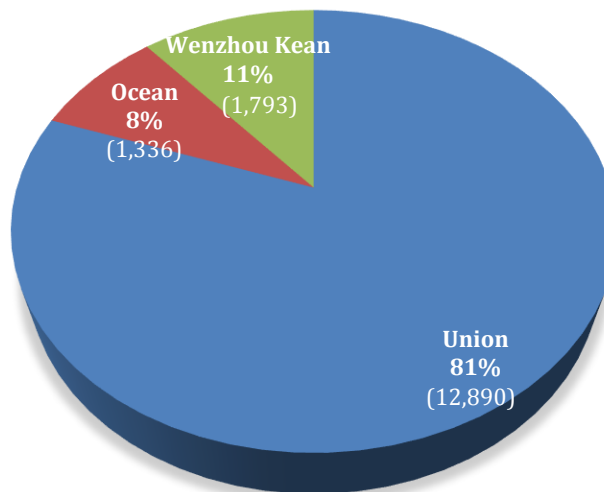


Union, NJ



Wenzhou, China

Over 15,000 Students Enrolled
on 3 Campuses Globally



Enrollment

NJCSTM's MISSION

"To serve the New Jersey region and Kean University as the leading scholars program in multi-disciplinary, applied science and mathematics education (STEM)"



NJCSTM opened 2004

Focus on High Impact Learning Practices

Innovative Academic Culture

- Honors program (~200 B.S. & M.S. students)
- Strong mentoring environment
- Fosters scholarship, leadership & original research
- Provide continuing professional development throughout career

Integrated Curriculum

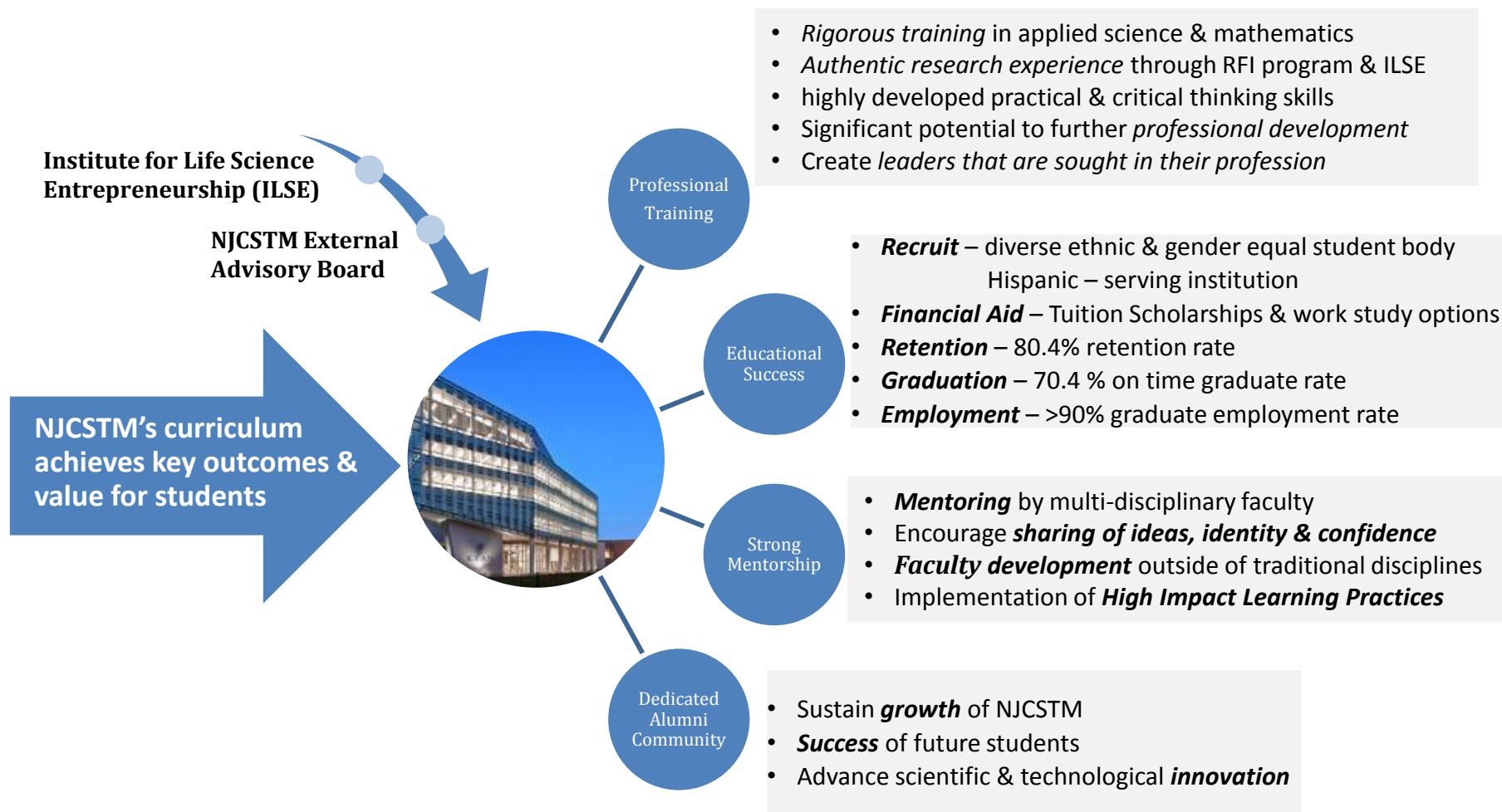
- Prepares students to be well-rounded scientist-researchers, medical professionals & scientist-educators
- Research-based learning experience
- "Cutting-edge" degree programs aligned with the skill needs and jobs of the future

NJCSTM: a State of the Art Teaching & Research Facility

- 133,000 ft² LEED Design Award winning facility
- 25,000 ft² of flex lab teaching space & 5 classrooms
- 20,000 ft² of fully functioning & equipped laboratories
 - Computational research
 - Chemistry
 - Molecular & Cellular Biology
 - Physics
- Modern instrumentation
 - NMR
 - mass spectrometer
 - cell sorting & microscopy
 - super-computing facilities
 - Computer assisted visual enhancement – virtual reality facility
- 320-seat auditorium
- 630-person atrium



NJCSTM's Approach



Ten High Impact Educational Practices



1st Year Seminars & Experiences

- Research Methods, T2K



Learning Communities

- Journal Club
- Biotech Club



Writing Intensive Courses

- Research & Technology
- Research Methods



Collaborative Assignments & Projects

- Independent Research



Undergraduate Research

- Research First Initiative
- NJCSTM Pollen Count Station



Diversity & Global Learning

- Diverse Student Population



Service & Community-based Learning

- STEM Ambassador Programs



Internships

- ILSE Opportunities
- StarX Allergy & Asthma



Capstone Courses

- Senior thesis project



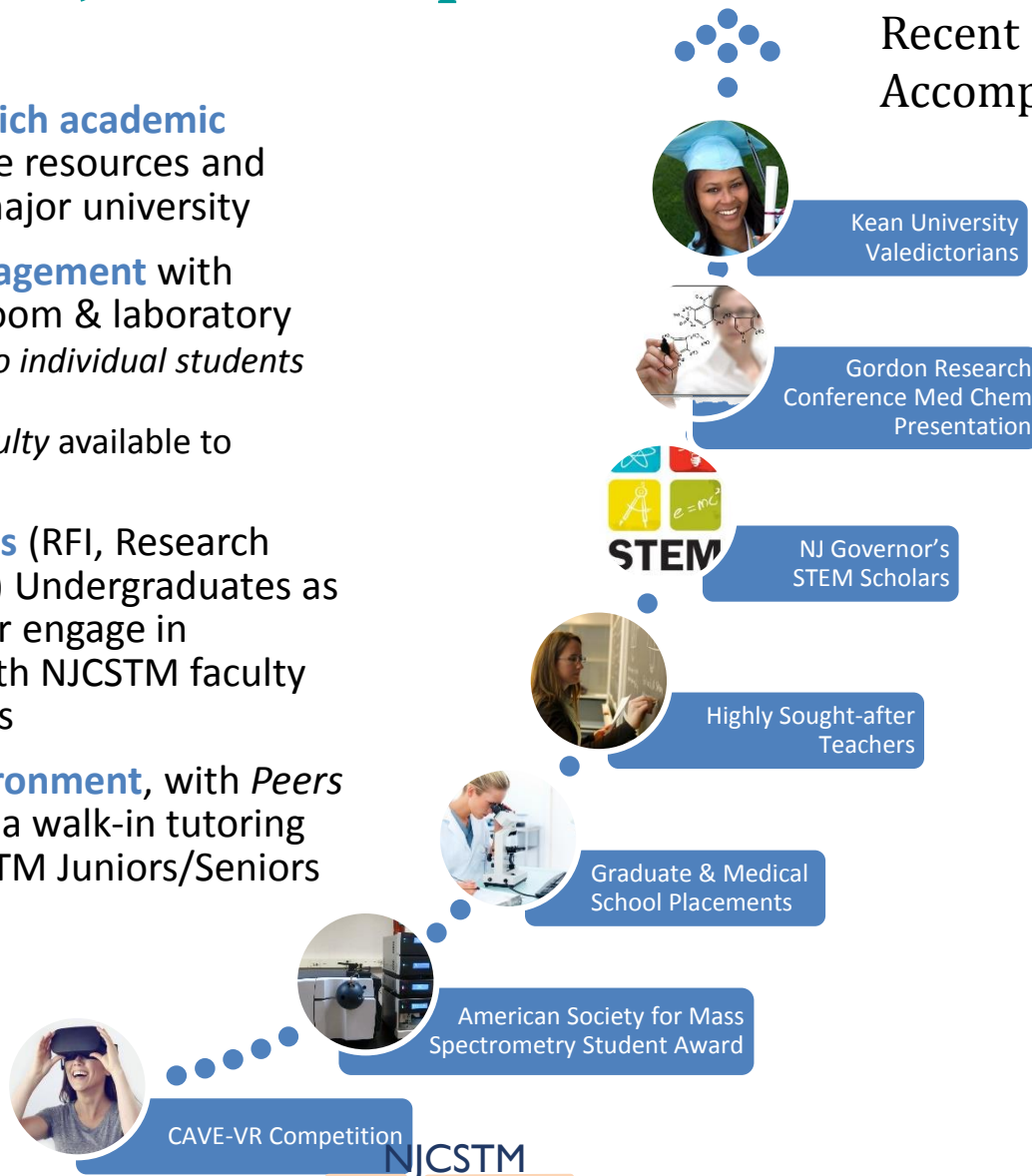
Common Intellectual Experiences

- Core Curriculum

What Makes NJCSTM Unique?

- **Small, personalized, rich academic environment**, with the resources and social presence of a major university
- **Extensive faculty engagement** with students in the classroom & laboratory
 - *Advisement tailored to individual students needs*
 - *Readily accessible faculty available to students.*
- **Creative opportunities** (RFI, Research Days, SpF grants, ILSE) Undergraduates as early as freshman year engage in authentic research with NJCSTM faculty and their collaborators
- **Supportive peer environment**, with *Peers On Demand Tutoring*, a walk-in tutoring service with top NJCSTM Juniors/Seniors hired as the tutors

Recent Accomplishments



NJCSTM's Degree Programs



Biomedicine (4 yr B.S.)



Engineering w/NJIT (5 yr B.S./M.S.)



Computational Science (5 yr B.S./M.S.)

- Applied Mathematics
- Bioinformatics
- Physics

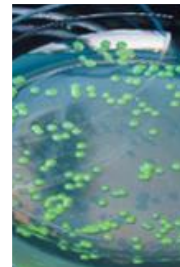


Molecular Biology (5 yr B.S./M.S.)



Education (5 yr B.S./M.S.)

- Biology
- Chemistry
- Mathematics



Biotechnology (2 yr M.S.)

- Advanced Biotechnology & Drug Discovery
- Analytical Chemistry & Instrumentation
- Bioinformatics
- Life Sciences Business Management

THE RESEARCH FIRST INITIATIVE: *for Undergraduate Students*

RFI is a *research-mentoring program* designed to train High School students and improve learning through *research* in the STEM fields

- Learn science by “*DOING*” *authentic* laboratory research
- Opportunity to experience real scientific “*Discovery*”
- Work alongside *faculty mentors & role models* to build confidence & identity
- *Engages students early* on a pathway to academic and career success in STEM.
- Strong focus on *increasing diversity & promoting career paths* in STEM for underrepresented groups.



GROUP SUMMER SCHOLARS RESEARCH PROGRAM: *for High School Students*

Group
Summer
Scholars
Research
Program

The New Jersey Center for
Science, Technology & Mathematics



2016



The NJCSTM offers a 6-week, hands-on research experience aimed at attracting and developing talented students who are interested in pursuing an education in a STEM field. Upon entering the program students are divided into small research teams that are paired with a faculty mentor conducting actual scientific research.

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- Opportunity to experience real scientific “*Discovery*”
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NJCSTM

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KEAN
UNIVERSITY

RFI & GSSRP:

Research Stream Topics (2018)



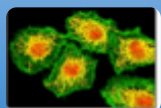
Analytical Chemistry

Dr. Dil Ramanathan, NJCSTM



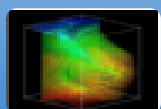
Bioinformatics

Dr. Shaadi Mehr, NJCSTM



Cancer Cell Biology

Dr. Salvatore Coniglio, NJCSTM



3D-Data Visualization

Dr. David Joiner, NJCSTM



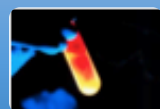
Drosophila Genetics

Dr. Elizabeth Mannheim, CNAHS



Microbiomes

Dr. Marshall Hayes, NJCSTM



Microwave Chemistry

Dr. Heather Stokes-Huby, CNAHS



Medicinal Chemistry

Dr. James Merritt, NJCSTM



Optical Wave Mechanics

Dr. Edward Farnum, NJCSTM



STEM Education

Dr. Brian Baldwin, NJCSTM

THE POLLEN PROJECT:

Kean University Pollen Count Reporting Station



- Regional Pollen Counting Station established at Kean University
 - Collaboration between StarX Allergy & Asthma Clinic, LLC & NJCSTM
 - Collect, count & report local pollen data
- Student run station with faculty supervision
 - Work study opportunities
 - Internship positions
- Source of student research projects
 - Data analytics
 - Climate variation research
 - Pollen identification & reporting
 - Computer automation & artificial intelligence
- Future directions
 - Student run business
 - Rotarod production & sales
 - Pollen counting services

Institute for Life Science Entrepreneurship

- Create “**Centers of Excellence**” in research, focused on Core Areas such as translational microbiology, oncology, rare diseases
- ***Build successful companies*** in the Core Areas, through development of internal and virtual capabilities for translational research and business support
- Develop, support and ***train life science entrepreneurs*** through establishment of programs delivered by local experts interested and experienced in life-science business creation
- ***Provide financial support*** for new and very early-stage companies through seed funds and investor relationships

Centers and Labs

Science Centers

- ATCC Center for Translational Microbiology

ILSE Labs

- Incubator
- Central Lab
- Core Lab Network
- Consulting Network

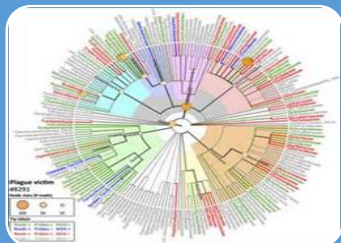
Entrepreneur Center

- Accelerator Program and Seed Fund
- Events
- Academic and Investor Boards



CTM Integrating research into NJCSTM

THE ATCC CENTER FOR
TRANSLATIONAL MICROBIOLOGY



Advanced
Microbial
Genomics



Microbiome
Research



Multi-Drug
Resistant Bacteria
(MDR) Collection

Kean Student & Faculty
Interactions

- ✓ Sponsor and training for 4 undergraduate student projects (STEM and Environmental Sciences)
- ✓ Sponsor and training for 3 graduate student projects
- ✓ Sponsor and collaborative to RFI Microbiome Research Stream
- ✓ Funded research collaborations with 2 faculty
- ✓ Taught STME 4951 "Antibiotics and Resistance"