

The Staff

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Science and the City
DG Hits the Rose Center
by Daniela DiBiase

Have you ever known someone who thinks he/she is the center of the known universe - that the world will stop if he/she is not around? There is a cure for this kind of egotism: a trip to the Museum of Natural History's Rose Center. One of the objectives of the Rose Center is to make human beings think about their relatively small place in the vast universe. On Tuesday's trip to the museum, the Defying Gravity participants learned about their size relative to the universe on a tour guided by astrophysicist, Dr. James Schweitzer.

At the Rose Center, "your egocentrism is atomized", said Dr. Schweitzer as he began the tour. Schweitzer explained the large gray Hayden Sphere, the central focal point of the Rose Center, is a reference for museum visitors to compare the various models on display that represent the galaxies, planets and organisms that comprise the universe.

The spiral ramp that projects out of the Hayden Planetarium is a model for the length of time the universe has existed, beginning with the Big Bang. Only the last eighth of an inch represents the existence of human beings. Fortunately however, the Rose Center did not entirely destroy the Defying Gravity participants' self image. Bronx Science high school teacher Neil Farley, said, "We are actually pretty small and insignificant in the universe, but I think we're pretty great..."

MOUNT SINAI LAUNCHES PROGRAM



Dean Emeritus Kase delivers encouraging words in opening speech

"We understand the interaction between good health and education."

-Dr. N Kase

Mount Sinai School of Medicine launched its newest collaboration with the National Space Biomedical Research Institute with a reception on June 15th. *2001: A Space Research Odyssey* is a Summer research institute that represents the first phase of *Defying Gravity*, a three-year educational outreach program based on space biomedical research conducted at MSSM.

The reception provided an opportunity for the participating students, teachers and research scientists to learn about the summer activities that will take place over the course of the five-week program. MSSM

basic and clinical research faculty, administrators and representatives from associated institutions attended.

Patrick J. Gannon, PhD, the director of the DG Program, opened the reception by welcoming all the participants and providing an overview of upcoming events. Dr. Gannon and MSSM/NSBRI faculty expressed their excitement about the ambitious educational outreach program.

Dr. Nathan Kase, Dean Emeritus of Mount Sinai School of Medicine, commented that the education outreach collaboration was familiar territory for Mount

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MSSM and NSBRI Team Up for Improved Science Curriculum in New York

Mount Sinai School of Medicine was founded on a principle of community involvement. Since its establishment in the mid-1960's, it has developed its curriculum, research priorities and novel academic disciplines with this ethos in mind.

Mount Sinai's increasing recognition as a world leader in medical science and research has paralleled the growth of its deep relationship with East Harlem. It is fitting then, that in an age of globalized information, Mount Sinai acts as the substrate for an educational outreach program that connects as broadly as nationwide and as locally as New York City.

Defying Gravity's summer institute, funded by the National Space Biomedical Research Institute, brings together students and teachers from across New York City to



MSSM has a strong relationship with the surrounding community of East Harlem.

explore the latest reforms in science education and to utilize the web as a teaching tool for the classroom.

The NSBRI is a leader in the research efforts impacting the "next exploratory step - the human exploration and development of space beyond Earth orbit." Zero gravity, space radiation, and maintaining a healthy psychology are some of the greatest obstacles for astronauts of the near future. Interplanetary travel will impose new challenges to

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Defying Gravity Takes Off at Mount Sinai

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Sinai, which has been serving the surrounding East Harlem community for 100 years. "We understand the interaction between good health and education," Kase added.

Dr. Miki Rifkin, vice president and dean of academic affairs at Mount Sinai, and an NSBRI board member, discussed the importance of the NSBRI in finding "countermeasures" for astronauts on long journeys in space. Microgravity takes its toll on the human body and research that can alleviate the problems associated with microgravity is important because NASA is planning to send astronauts to Mars in the next five years.

Dr. Bernard Cohen, a leading NSBRI scientist studying vestibular adaptation, opened the scientific forum with a video of astronauts in space conducting his research.

Dr. Mitchell Schaffler, the Orthopedics Research Director at MSSM, spoke about his research examining the deleterious effects of microgravity on bone tissue. Schaffler uses the absence of gravity as an

experimental tool to study human adaptation to earth's gravitational environment. In relation to bone density, Schaffler's motto is "In space [as on earth] if you don't use it, you lose it."

Program Co-Director Nancy Kheck, PhD emphasized the formal collaborations with the AMNH's Rose Center for Earth & Space, the New York Hall of Science and the strong support from the NYC Board of Ed. This NSBRI-funded program is unique in its approach to developing high-school level math and science curricula using the technology of the Internet.

Over the summer scientists, HS teachers and students will work in teams to create 9-11th grade curriculum modules. The goal is to teach traditional math/science concepts in the context of the challenges to human physiology in the exploration of space. Participants will be immersed in the space theme with field trips to AMNH Rose Center and the NY Hall of Science. Participants will also take seminars in various computer programs and perform lab work under the direction of the Mount Sinai faculty.



Dr. Schweitzer of the Rose Center explains relative size does matter



Participants' enthusiasm shows in T-shirt frenzy

Summer Research Institute Welcomes Participants

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maintaining all aspects of health in space. That is why the NSBRI has focused its attention on fourteen specific research areas, including such fields as Radiation Effects, which investigates the dangers of radiation when humans leave the protective shield of the Earth's atmosphere. Such research has local effects too: radiation risks from hazardous materials and nuclear reactors will be studied in order to ensure safety on Earth. The NSBRI aspires to combine the novel disciplines of space biomedical research with well-grounded technologies that benefit earthbound humankind as well.

Educating the public is a major goal of the NSBRI. With sights set on the stars, research programs across the nation will also disseminate scientific knowledge to all levels of public learning, from elementary schools to major universities. In fact, a new trend in government funding agencies (e.g. National Science Foundation, NASA) requires a percentage commitment to Education and Public Outreach (EPO) programs. Here in New York, the Defying Gravity Summer Research Institute at Mount Sinai School of Medicine focuses on the development of a science based curriculum for ninth and tenth grades. A selection of nine students from around the City,

along with six science teachers have been invited to participate in hands-on laboratory research led by top scientists at the medical school. Direct interface between young students and mature scientists, with a strong emphasis on improving teaching methods will lead the program to develop a more comprehensive science curriculum with the aims of improving science education for New York State and the nation.

For many years, Otolaryngologists have had a strong relationship with NSBRI, as recognized by Dr. Mark Urken, Chair of ENT at Mount Sinai, who is proud that five researchers from his department are involved in the DG program.

With goals as lofty as sending humans to Mars in the next few years, and as earthly as improving the standards for our children's education nationwide, we welcome our participants to the Summer Research Institute as we head into a new frontier and a new millennium.

Patrick J. Gannon, PhD - Program Director, DG Program

Nancy Kheck, PhD - Co-Director and Administrator, DG Program

Nathan G. Kase, MD - Dean Emeritus, MSSM

Patricia McArdle, EdD - Associate Dean of

Curriculum and Medical Education Research
Susan Wearne, PhD - Asst. Professor,
Biomath sciences and Neurology
Maria Deftereos, BS - Research Coordinator

Graduate Assistants:

Daniela DiBiase - New York University

Ben Blattberg - Bard College

Jason Schneiderman - MSSM

Craig Rothstein - New York University

MSSM Advisory Committee

Bernard Cohen, MD - Professor of Neurobiology

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Morton Slater, PhD - Dir. Queens Gateway Pgm.

Next Issue:

Interviews with Drs. Patricia McArdle and Martin Weiss. Updates on curriculum progress. Participant opinions.

Plus... Features on NY Hall of Science and exciting developments in lab modules.

Program Director Patrick J. Gannon

Patrick J. Gannon's Curriculum Vitae reads like a Dostoevsky novel: it's long, it reads slow and arduous, and by the time its over, the reader is assured of the sheer brilliance of its author. Dr. Gannon began his educational journey in London, England, where he received his diploma in Physics, Chemistry and Optical Sciences. He went on to receive his bachelor's degree from the University of Central London. From there, Dr. Gannon worked on two master's degrees at CUNY, finally receiving his Doctoral degree with a thesis on language mechanisms in the primate brain.

As if this weren't enough, Dr. Gannon's post-graduate work shows no sign of slowing down. He is an assistant professor at Mount Sinai School of Medicine; director of the Neurobiology Research Laboratory; co-director of the Rhinology Research Laboratory; member of the NSBRI Consortium; and he is professionally affiliated with NYU/MSSM Program in Biomedical Sciences, NY Consortium for Evolutionary Primatology and NYU's Dept. of Anthropology.

So enough about Dr. Gannon and let's talk more about Dr. Gannon. He is the educational outreach director of the



NSBRI program entitled Defying Gravity and this summer he is running the five-week program: *2001: A Space Research Odyssey*. The program is an ambitious effort to create a new and improved nationwide curriculum for High School science and math. Under the auspices of space biomedical research, Dr. Gannon envisions creating a curriculum that will appeal to students based on its lofty goals as well as its applicability here on earth.

He is uniquely suited for his job: Dr. Gannon has a history of teaching at local schools; he has mentored levels of education as disparate as undergraduate and postdoctoral; he has been a thesis advisor for several master's recipients; and he has conducted K-12 Science Educational Outreach at several NYC high schools since 1992.

Dr. Gannon's unique personal background, including a stint as a professional photographer, in addition to his impressive academic accolades and teaching experience at all levels of public education make him not just the best, but perhaps the only person for the job.

Administrator and Co-Director, Nancy M. Kheck

Dr. Nancy Kheck received her Doctor of Philosophy degree in Neuro-biology with distinction from New York University in 1998. Her thesis research focused on mapping the neuroanatomic and functional expression of central nervous system 5-HT1A receptor populations in a rodent, feline and monkey model. She performed her postdoctoral research at Mount Sinai's Otolaryngology Department where she



worked with Dr. Gannon in the Comparative Neurobiology and Rhinology lab. Dr. Kheck's postdoctoral projects included researching neurochemical and structural elements of the brain regions with functional asymmetry,

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Defying Gravity Aims to Improve Science Education Standards

The National Science Education Standards were developed to increase science literacy in a world increasingly populated by the products of scientific investigation. The Standards were developed in 1989 under the administration of President George Bush. Support was maintained through the Clinton Administration and continues today.

Science Education reform took shape in the late 1980s. In 1989, the American Association for the Advancement of Science (AAAS) published Science for All Americans, defining scientific literacy for high school graduates. In 1991, the National Science Teachers Association asked the National Research Council to organize nationwide standards for science education. Leaders of various science and education organizations, the U.S. Secretary of Education, the Assistant Director for Education and Human Resources at the National Science Foundation, and the chairs of the National Education Goals Panel banded together to encourage the NRC to lead the development of the national standards for content, teaching and assessment in science education. Subsequently, major funding for the project was provided by the Department of Education and the National Science Foundation.

The Standards include objectives to be reached for: science teaching; professional development for science teachers; assessment in science education; science content; science education programs; and science education systems. The overall goal of the Standards incorporates a vision of a scientifically literate society comfortably coexisting with the ever-growing number of scientifically innovated products. The idea is that science has come to permeate many aspects of daily life, from medicine and physical health, to technology and global information networks, from how we live our lives on earth to the way we reach for the heavens in our exploration of space beyond earth's orbit.

New York State's science curriculum brings the national concern into local focus. Creating symbiosis among Curriculum Standards, Assessment Systems and Instructional Programs via links such as improved syllabi, curriculum guides,

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Dr. Schweitzer and the Defying Gravity team

Science Ed. Standards

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teacher observation, group activities and facilities and technology available to students and instructors alike, the goal is improved science education standards.

At Mount Sinai School of Medicine, the Summer Research Institute, Defying Gravity combines the resources of the school, the knowledge of seasoned scientists working in conjunction with the NSBRI, NYC high school students and teachers and others in an effort to create a better science curriculum, the results of which will be disseminated on state and national levels. By learning how to bridge the gap between accomplished science professionals and young students interested in exploring science, Defying Gravity will provide much needed information on how to better teach science in the classroom.

In the future, scientists will depart from their laboratories and visit classrooms in schools across the city, teachers will utilize program materials to improve classroom performance, and a stand-alone web-based curriculum will be produced as a tangible culmination of the program's efforts.

The goal of the Defying gravity program is to utilize the NSBRI's fourteen space biomedical projects as an educational foundation showing links between the studies of future space exploration and earthbound medical advancement. *2001: A Space Research Odyssey* functions as a front-end evaluation where end-users (HS students and teachers) provide the framework within which goals and objectives may be developed. With support from federal, state and local agencies, Defying Gravity plans an exciting summer of research, education and, ultimately, improved science education standards for all of New York State.

Opinions

Though prior to the start of the program Matthew Dusenberry of City Island had "no idea" what to expect; after the first week he has an "idea of what we are doing. We have more focus, more details." When asked how he feels about his place in the program now, Matthew replied: "We [students] are all antsy to start work." His enthusiasm is reflected in the long hours and hard work put in by the students each day of this first week of the summer institute.

During the weekly Friday brainstorming session, teachers and students spoke in turn to relate their feelings on the events of the previous days. In response to trips to the AMNH Rose Center and the NY Hall of Science, Teacher Dennis Bassin commented as a former museum educator that the Hall of Science is "in the business of provoking thought." The Defying Gravity program, he added, needs to accomplish the same objective. Bassin endorsed the idea of travelling exhibits that would aid in the wide dissemination of science information. Dr. Patricia McArdle seconded Bassin's opinion, adding that travelling exhibits would bring science to the public who could not easily access New York City's museums.

Applied Technology

Humans are not the only ones who need protection from the harmful radiation found in space. At the U. of California, Davis, researchers are discovering new ways of protecting delicate microchips from damage that occurs from radiation-induced electrical charges in the insulation between transistors. Graduate student Anne Vandooren studies how heat, gamma rays, X-rays, and proton irradiation affect microchips. Though NSBRI research focuses on the human aspect, it is of crucial importance to consider the health of the equipment we send into space as well. With collaboration between machine and human-focused research projects, missions into space become more feasible with each step.

For more on this and other science developments, go to www.sciencedaily.com/releases.

Kheck, *Continued from page 3*

Broca's and Wernicke's area (language areas) homologs in macaques, and studying Sylvian fissure morphology in chimpanzee brains.

Dr. Kheck currently divides her time between education and research. She has extensive teaching experience and has taught at the undergraduate, graduate and medical school level. Dr. Kheck teaches labs in Brain and Behavior, and Gross Anatomy to Mount Sinai School of Medicine students, Clinical Neuroanatomy at Sophie Davis Medical School-CUNY and Drugs and the Brain, a graduate level course at NYU. She is as dynamic and passionate in the classroom as she is in the lab. Her enthusiasm for science and love of learning are clearly evident to all her students.

Dr. Kheck has been involved in community outreach programs since 1992. She speaks at local schools in an effort to get students more interested in science and research.



Nancy Kheck leads discussion

LAUNCH

by Jason Schneiderman

Hello and welcome to the initial installment of Launch, the weekly column that explores the recourses available to you on the Internet. I will be showcasing some of the best educational and space websites out there, as well as bringing you helpful tips and pointers on exploring the net and creating your own website.

Ok, now onto the meat and potatoes of this column. Participants in the Defying

Gravity program have been provided with reference material on the Internet and website creation in their binders. This material will be helpful as you familiarize yourself with the Internet and learn to author your own website.

Some Educational Sites on the Net:

NeurOn:

<http://quest.arc.nasa.gov/neuron/>

NASA Spacelink:

<http://spacelink.nasa.gov/>

NASA Explores:

<http://www.NASAexplores.com/>

Power To Learn:

<http://www.powertolearn.com>

To Learn More About:

US Space Camp and Academy:

<http://www.spacecamp.com>

Further Interests in Sci-Fi:

The Science Fiction Forum:

<http://www.sf4m.org>

ICON:

<http://www.iconsf.org>

The Society for Creative Anachronism:

<http://www.sca.org>