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**Testimony of Ross A. Frommer, Vice President of
Government & Community Affairs and Associate Dean at
Columbia University Medical Center, at the New York State
Legislature Joint Hearing on the FY 2016/2017 budget.**

February 2nd, 2016

Good afternoon. My name is Ross A. Frommer, Vice President of Government & Community Affairs and Associate Dean at Columbia University Medical Center and I strongly urge the committee to include \$50 million for the **New York Fund for Innovation in Research and Scientific Talent: “NY FIRST”** in the FY 2016/17 budget.

The deans of New York State’s 16 medical schools, through the Associated Medical Schools of New York, are urging a \$50 million investment in what many other states have recognized as a central component of our new innovation economies – biomedical research. For several years, with some degree of success, the deans of New York’s medical schools have been advocating for funds to support the recruitment and retention of world-class scientific talent. We are honored to have received the support of more than 30 members of both the Assembly and Senate for the Faculty Development Program (FDP), including Majority Leader Morelle, Chairman Farrell, Chairman Schimminger, Chairman Gottfried, Deputy Majority Leader DeFrancisco, Chairman Golden, Chairwoman Young and Chairman Boyle.

NY FIRST improves on FDP by focusing investments squarely on the economic development capacities of research laboratories. This investment would support the development of dozens of additional laboratories throughout the state, each of which functions as a small – and sometimes not so small – business within medical schools’ infrastructures, employing 10 or more highly-skilled researchers and support staff, and generating the intellectual property that leads to new cures and new business opportunities.

The goals of the program are to (1) provide support to existing and future economic development and health initiatives along the length of New York State’s bioscience pipeline, (2) maintain New York State’s position as a national and

international leader in state-of-the-art research and innovative healthcare in the face of massive investments from competing states, (3) support New York State's regional economies through the development of startup and spinout companies, and (4) facilitate the development of, and access to, new cures.

With a \$50 million State investment we can further transform New York State's economy into one based on innovation, research and scientific talent. The State contribution will be matched 2:1 by New York State's 16 medical schools, resulting in an overall investment of \$150 million.

You are already aware how successful FDP has been. That program yielded a greater than 7 to 1 direct return on the State investment. Without such support, we will continue to lose our top scientists, their millions in federal grant money, the clinical trials they launch and the startup companies they create, to other states like California, Massachusetts, North Carolina, and, heaven forbid, Texas.

New York State is simply not keeping pace with other states in this field. States such as Minnesota, Indiana, Nevada and Utah – each with only one medical school – are appropriating tens of millions of dollars to those institutions to support bioscience infrastructure. More aggressive bioscience investors, such as California, Texas and Massachusetts, are allocating billions of dollars for the same purpose. When Pfizer closed its Connecticut research and development facilities, the state responded with a multi-faceted \$1.5 billion program to bolster its bioscience sector, cognizant that it would continue to play a key role in its economic future.

New York State continues to lag behind these efforts and, as a consequence, notable researchers are being lured to other states. Since 2011, 13 of our state's top scientists (among them a global leader in immunotherapy) have been recruited to Texas alone; others have accepted offers from Massachusetts, Florida and Nevada.

Of course, this is not merely a direct investment in the economy; the health care cost savings resulting from medical breakthroughs are significant. According to the 2011 report compiled for the Association of American Medical Colleges (AAMC) *The Economic Impact of Publicly Funded Research*, "by 2050 a projected 11 million to 16

million people age 65 and older will have Alzheimer's disease. One estimate calculates the cumulative costs of care for people with Alzheimer's disease from 2010-2050 will exceed \$20 trillion in today's dollars."

At his State of the State address, Governor Cuomo spoke very eloquently about the effect that breast cancer had on his family this past year and his proposed budget includes significant funding for breast and prostate screening. Like all of us, he wants to see better prevention strategies, more effective treatments, and hopefully someday a cure for these and other dreadful diseases. That will come with research and the NY FIRST program will help ensure that more of that research gets done right here in New York State.

Further details about the NY First program are attached at the back of my testimony, but what I really wanted to do here today is to tell you another story of why this program is so important and would be a very wise investment by New York State. Last year I came before this committee and told you of Rudy Leibel, a faculty member at Columbia and who after receiving an FDP grant, chose to continue his career doing diabetes and obesity research in New York. This year I would like to tell you the story of another fantastic example of a scientist who is doing great work in New York, Angela Christiano.

Doctor Angela Christiano is the Richard and Mildred Rhodebeck Professor of Dermatology and Professor of Genetics and Development at Columbia University Medical Center. Her work focuses on the genetics and cell biology of skin and hair diseases. She and her colleagues focus on ways to better understand, prevent, treat, and hopefully someday cure conditions such as Alopecia Areata, (which Dr. Christiano has herself), Androgenic Alopecia, (male and female pattern baldness) Epidermolysis Bullosa (blisters), and Hypertrichosis (werewolf syndrome). She is also working to develop a new 3D skin construct to help burn victims with replacement skin that will actually feel sensation and have pigmentation. Last month, we had the honor of hosting Lieutenant Governor Kathy Hochul on campus and she had a chance to meet Dr. Christiano and see her very impressive work up close.

After completing her PhD, Dr. Christiano came to Columbia in 1995 to begin her research career. Very early on she made several important breakthroughs and published important and well regarded papers in many of the most prestigious scientific journals. As you might expect with someone who had such success at this early stage of her career, the offers started coming in as several other medical schools and research institutions across the country, across the world in fact, tried to recruit her away from Columbia.

In 2006, an out of state institution made her a very attractive offer that was almost too good to pass up, but in the end Columbia was able to convince her to stay. The primary reason we were able to do so was that we received an FDP grant from what was then the New York State Foundation for Science, Technology, and Academic Research (NYSTAR), now part of ESD.

The NYSTAR grant was for roughly \$250,000 per year for three years, for a total state investment of \$750,000. Since that time, Dr. Christiano has received over \$25 million in federal grant support and other funding.

Today Dr. Christiano is responsible for fifty good paying jobs and this does not include general campus support jobs like maintenance, security, and animal care which her lab indirectly supports. These are jobs that not only offer a good salary, but provide health insurance, retirement benefits, and educational support for employees and their families as well, i.e. the kind of jobs that allows families not only to support themselves, but to move up the economic ladder and build strong communities.

So in 2006, New York State invested three quarters of a million dollars in Dr. Christiano. She used that money to hire additional staff and purchase equipment. One thing it was not used for was to increase her own salary. All of the state money went into supporting other jobs and making large equipment purchases.

A little over ten years later and the return on that investment is over 35 to 1 and counting. My very back of the envelope calculations show that just the New York State income tax revenue alone from Dr. Christiano's lab is north of a \$150,000 per year.

One of the other requirements for the original FDP grant was a proven track record in technology transfer. Dr. Christiano has excelled in this area as well. Since receiving the FDP grant she has filed thirty-five invention disclosures and received twenty six patents. She has also started three companies.

I remind you that the original grant was a retention grant designed to prevent Dr. Christiano from leaving. By definition, if not for the FDP grant, all of her work, and the jobs and economic activity that come along with it, would be occurring elsewhere and not in New York.

I submit that we want more scientists like Angela Christiano, like Rudy Leibel coming to, not leaving, New York, and the FDP has a proven track record of making this happen. I have provided two examples, but there are countless other examples of NYSTAR FDP grant recipients who have had and continue to have very successful research careers in New York – upstate/downstate, SUNY/private. In fact, of the fifty-two awardees, over 80% are still doing research, still moving science forward, still bringing in grant money, and still creating jobs in New York.

You have heard about the highly productive scientists who have left to go to Texas and elsewhere, but research institutions across the state can also tell you stories of big fish that got away – top scientists with significant funding who came very close to accepting a faculty position in New York, but for whatever reason the deal could not be sealed. With a little help from the State, many of these recruits could have chosen to come to New York and would be doing research, bringing in grants, and creating jobs here instead of in other states. And notably, these are jobs with long-term stability in New York State; given their complex infrastructures and deep community ties, our medical schools are not at risk of relocating their operations or jobs outside the state.

Each time we lose a scientist, each time we fail to recruit someone, it is like leaving money and jobs on the table. The federal budget which President Obama signed in December includes a \$2 billion dollar increase for the budget of the National Institutes of Health (NIH), the federal agency which funds biomedical research. FY 17 looks promising as well. This may sound a little selfish, but the question is where is this

money going to go – to Texas, Massachusetts, Connecticut, or New York? Simply put, the more talent we have, the more NIH dollars we will bring in, and the more NIH dollars we bring in, the more jobs we create.

No doubt this is an extremely exciting time in biomedical research, a time that will lead to better strategies for the prevention, treatment, and cure of a variety of different diseases, as well as spur great economic development and job growth. The question is how well will we as a State be prepared to take advantage of these opportunities? Before coming to Columbia, I had the great honor of serving on the staff of former Senator Daniel Patrick Moynihan. Each year, Senator Moynihan produced a report that showed something that no doubt you are all aware of – New York is a net donor state to the federal government. We pay far more in taxes than we receive in benefits from Washington.

One of the biggest exceptions to this rule though is research funding. New York represents 6.2% of the US population yet we receive close to 9% of the NIH extramural research funding. But how are we going to maintain this stature? How are we going to keep research dollars coming to our medical schools? We used to rank second in NIH funding, but Massachusetts overtook us. Other states, North Carolina, Pennsylvania, Texas, are nipping at our heels. What are we going to do to keep the talent, the research, and the jobs here?

This legislature has done a lot of good work in this area, as has Governor Cuomo and previous Governors, but for the most part, state efforts have focused on technology transfer and private sector development – things like how to get through the so called “valley of death.” This is all important but it is not going to happen without ideas and talent. That is why the NY FIRST is so important. The program will attract and keep scientific talent in New York. That talent moves science forward and leads to ideas that can become the next great discovery, the next great blockbuster drug, all the while, generating grant revenue and creating jobs. You can’t get good output unless you have good input.

So for all the reasons mentioned above, I strongly urge you to include \$50 million for NY FIRST, to be matched 2 to 1 by the State's medical schools. Building on the great successes of the Faculty Development Program, this new partnership will keep and attract the top talent, the rock stars of science if you will, in New York and put us in a better position to compete with other states. Let's continue to make New York a place where scientists want to be. Don't let our talent get away. Let's work to ensure that the next Angela Christiano, or better yet, Angela Christianos choose to do their research right here in New York.

The New York Fund for Innovation in Research and Scientific Talent:

“NY FIRST”

Request

A \$50 million annual State investment to further transform New York State's economy into one based on innovation, research and scientific talent. The \$50 million State investment will be matched 2:1 by New York State's 16 medical schools, resulting in an overall investment of \$150 million.

Goals

1. To provide support to existing and future economic development and health initiatives along the length of New York State's bioscience pipeline. Such support will advance drug discovery, accelerate commercialization and, more broadly, bolster the state's bioscience economy.
2. To maintain New York State's position as a national and international leader in state-of-the-art research and innovative healthcare, in the face of massive investments from competing states.
3. To support New York State's regional economies through the development of small business initiatives within existing medical school infrastructure as well as through startup and spinout companies.
4. To facilitate the development of, and access to, new cures by increasing the number of clinical trials that will be conducted in New York State.

New York Fund For Innovation in Research and Scientific Talent (NY FIRST)

NY FIRST is a \$150 million per year initiative to support the development of 50 bioscience research laboratories throughout the state. Each laboratory functionally operates as a small, and sometimes not so small, business within the medical schools' infrastructures, employing approximately 10 highly skilled researchers and support staff. To support these enterprises, the Associated Medical Schools of New York is requesting \$50 million from the State; the medical schools in return will match \$2.00 for

every dollar the State invests. These funds will be expended over four years and will support the laboratories of star researchers – world-class scientific talent with proven records of scientific accomplishment and a demonstrated history of entrepreneurship and obtaining grant and other external funding. The funds will be used primarily to renovate laboratories, purchase equipment and supplies, and support the investigators, postdocs and ancillary staff that are needed to develop and maintain a growing, thriving laboratory.

Whereas the needs of each recruitment will be different, a typical apportionment of grant funds could be as follows:

- State funds would be used for supplies, equipment, renovations, and some laboratory personnel.
- The medical schools' match funding will be used to support the Principal Investigator's salary, supplies, lab personnel, renovations and equipment.
- State funds will not be used for the Principal Investigator's salary

Recruitment Criteria and Award Methodology

Funds will be available solely for the purpose of establishing new laboratories at recipient institutions, or for the retention of laboratories with bona fide offers from outside New York State. The scientific talent recruited to start these laboratories must:

- Have at least one NIH R01 or similar federal grant
- Hire, or retain, a team of scientists and other staff such as postdoctoral students
- Possess a proven record of innovative research with clear potential for commercialization
- Be employed, or have been recently employed, by an institution or company outside New York State (or have a bona fide offer from an institution from another state)

Awards would be made via a peer review process pursuant to which applications would be reviewed by third parties from outside the state with no vested interest in the

outcome.

Job Creation

NY FIRST has clear potential to create and sustain thousands of high skilled, high wage jobs over a 10-year period. A \$1 million investment by the State (again, matched 2:1 by the recipient) would typically enable the recruitment of one world-class laboratory with approximately 8-10 employees. A \$50 million annual investment by the State, then, would yield 4,000-5,000 direct jobs over 10 years (one year = 50 labs; 400-500 FTEs).

- Years 1-4: 200 labs; 1,600 – 2,000 FTEs
- Years 5-10: 300 labs: 2,400 – 3,000 FTEs
- **Total Years 1-10: 500 labs; 4,000 – 5,000 FTEs**

Economic Development

The precursor to NY FIRST (the NYSTAR Faculty Development Program) had an impressive, demonstrable positive return on investment. From 2002 to 2009, a \$38 million investment by New York State enabled the recruitment and retention of entrepreneurial scientific talent who, during that period, leveraged their awards into more than \$250 million in additional federal grants and private philanthropy – a 7:1 return. Notably, this only accounts for direct follow-on awards, and does not include indirect economic benefit, nor does it capture the value of the intellectual property and startup/spinout companies those scientists developed. Moreover, the State stopped collecting data in 2009; since 80% of FDP awardees are still doing science in New York, the actual economic impact of the program, although it cannot be specifically quantified, is undoubtedly higher.

By dedicating funds to NY FIRST, the State will be making an investment in a significant and increasingly important part of New York State's innovation economy. Moreover, due to the geographic distribution of New York State's medical schools, the benefits of this

investment will accrue to regional economies across the state. Notably, these are high wage jobs (averaging \$70,000 per year per Battelle's 2014 report, and exceeding the statewide average private sector wage) at institutions with deep historical roots in New York State. Given their complex infrastructures, their partnerships with other health care entities and their local communities, these institutions are stable employers over the long-term, and will continue to be an important component of the state economy for the foreseeable future, meaning that, in contrast to other economic development initiatives, there is little risk that state investments in this program will simply flow out of state and fail to provide in-state jobs.

In addition, each new laboratory will be headed by an entrepreneurial senior scientist who will apply for intellectual property protections, execute licensing agreements and initiate new company formation. In 2012 a sampling of New York State's medical schools revealed:

- 757 invention disclosures
- 9 copyright registrations
- 842 patent applications
- 269 patents issued
- 175 licensing agreements
- 9 startup/spinout companies created
- 4 SBIR/STTR grants

Faster Cures

Translational research is the key to accelerating next-generation cures. The National Center for Biotechnology Information defines translational research as "the process of applying discoveries generated during *research* in the laboratory, and in preclinical studies, to the development of trials and studies in humans." Clinical trials are an essential component of bringing new therapeutics to market, as well as making the very latest treatments available to patients most in need. New York State has long been a

leader in clinical trials, with more than 19,000 NIH-sponsored trials currently under way. The purpose of these trials includes:

- Evaluating one or more interventions (for example, drugs, medical devices, approaches to surgery or radiation therapy) for treating a disease, syndrome or condition.
- Finding ways to prevent the initial development or recurrence of a disease or condition. These can include medicines, vaccines, or lifestyle changes, among other approaches.
- Evaluating one or more interventions aimed at identifying or diagnosing a particular disease or condition.

Without basic science research, and the laboratories that drive novel approaches, there would be no clinical trials in New York State. Of course, not all clinical trials lead to cures, but they provide important treatment pathways for many New Yorkers, and are a critical final step before new treatments come to market.

The Need

New York State is simply not keeping pace with other states in this field. States such as Minnesota, Indiana, Nevada and Utah – each with only one medical school – are appropriating tens of millions of dollars to those institutions to support bioscience infrastructure. More aggressive bioscience investors, such as California, Texas and Massachusetts, are allocating billions of dollars for the same purpose. When Pfizer closed its Connecticut research and development facilities, the state responded with a multi-faceted \$1.5 billion program to bolster its bioscience sector, cognizant that it would continue to play a key role in its economic future.

New York State continues to lag behind these efforts and, as a consequence, notable

researchers are being lured to other states. Since 2011, 13 of our state's top scientists (among them a global leader in immunotherapy) have been recruited to Texas alone; others have accepted offers from Massachusetts, Florida and Nevada.

As with Connecticut, all of the aforementioned states have recognized that bioscience has a key role to play in their economic futures. This is in part a recognition that US economies continue to evolve from manufacturing and service industries towards innovation. It is also recognition of the robust economic multipliers within the bioscience sector. In a 2011 report compiled for the Association of American Medical Colleges (AAMC), *The Economic Impact of Publicly Funded Research*, it was demonstrated that every dollar invested in research at medical schools and teaching hospitals yields an additional \$2.60 in economic activity.

Of course, this is not merely a direct investment in the economy; the public savings resulting from medical breakthroughs can be significant. Again, according to the 2011 AAMC report, "by 2050 a projected 11 million to 16 million people age 65 and older will have Alzheimer's disease. The direct and indirect costs of caring for people with Alzheimer's and other dementias was estimated to be more \$148 billion in 2005...One estimate calculates the cumulative costs of care for people with Alzheimer's disease from 2010-2050 will exceed \$20 trillion, in today's dollars."

New York State, historically a global leader in bioscience, must make a bold investment in entrepreneurial research to maintain, and grow, this vital part of its innovation economy.

