Dear Governor Murphy:

As Chairperson of the New Jersey Commission on Cancer Research and on behalf of our Commissioners, it gives me great pleasure to report on our activities over the past two years for 2018 and 2019.

In our 36-year history since the NJCCR was formed, by the NJ State Legislature, we have awarded more than $45 million for over 900 peer reviewed cancer research grants and student fellowships. Our grantees have leveraged a return of over $10 in federal research funding for every NJCCR dollar awarded for over a total of $455 million. These grants have been awarded to the Cancer Institute of New Jersey, Rutgers University both in Newark and Piscataway, Princeton University, Rutgers School of Dental Medicine, Cooper Medical School at Rowan University and to the Center for Discovery and Innovation at Hackensack Medical Center.

These funds can be used for basic cancer science research, including research for breast, lung, colon and prostate cancer. We have instituted our Annual Fall Cancer Research Symposium where, for the past two years, we have had greater than 60 poster presentations by the grantees presenting their research findings. At this event, we had a panel discussion on post-fellowship employment opportunities by members of the New Jersey Commission on Cancer Research to help grantees find positions after they have completed their research work.

At the symposium, we also had an award presentation of people who have been advocates for cancer research in our state. These past two years, we have had the privilege of honoring both NJ Assembly Majority Leader Lou Greenwald and NJ Senate President Stephen Sweeney.

In addition, we awarded a Research Award to both Dr. Michael Gallo of Rutgers and have also honored cancer advocates such as Sister Maggie Lopez from the American Cancer Society and patient advocates that included Phyllis Salowe-Kaye and Debbie Madiraca.

I am pleased to announce that many of the dedicated volunteer Commissioners who serve on the NJCCR are very involved, both statewide and nationally, in cancer activities. Dr. Shawna Hudson
was named to the American Society of Clinical Oncology Cancer Survivorship Committee and is involved with providing leadership and oversight for the society’s cancer survivorship activities nationally.

Dr. Jonathan Yavelow is Faculty Director for Rider University Health Studies Institute where they address healthcare disparities across our state.

Dr. Li Li from Novartis Pharmaceuticals was an invited speaker this year before the China Society of Toxicology.

Dr. Anna Marie Skalka, our Chair Emerita, from the Fox Chase Cancer Center authored the book this year, “Discovering Retroviruses: Beacons in the Biosphere”. This book explains the history of retroviruses and has been well-received nationally.

Dr. Wendy Budin, who is Professor and Associate Dean at Rutgers School of Nursing, received the March of Dimes “Nurse of the Year Award” for research for 2018. In 2019, Dr. Budin co-authored the book “Current Trends in Oncology Nursing Research”.

I personally had the good fortune in 2018 to receive the Vision and Legacy Award from Summit Medical Group for years of volunteerism to our local community.

In addition, Dr. Generosa Grana and myself were both named on the “Top Doctor” list in “New Jersey Monthly” for caring for oncology patients.

The Commissioners of the New Jersey Commission on Cancer Research would also like to thank the staff and support we have received from the leadership of the NJ Department of Health. We look forward to your support as our governor so that the NJCCR can accomplish its mission to provide the funding and administrative support to help patients with cancer within our State.

Respectfully submitted,

*Kenneth R. Adler M.D., F.A.C.P.

Chairperson, NJCCR*
The New Jersey Commission on Cancer Research (NJCCR) promotes significant and original research in New Jersey into the causes, prevention and treatment of cancer and serves as a resource to providers and consumers of cancer services.

The overall objectives, strategies, and priorities of the NJCCR are set by the membership, who are volunteer experts in various relevant areas. The members actively participate in overseeing the program and making final recommendations on the research projects to be funded. In each grant cycle, the NJCCR supports applications based on peer reviewers’ evaluations, assessment of responsiveness to program priorities, and available funds.

**MEMBERS**

Kenneth Adler, M.D., FACP, Chair
Kathleen Scotto, Ph.D. Vice Chair
Anna Marie Skalka, Ph.D. Chair Emerita
Generosa Grana, M.D., FACP
Shawna Hudson, Ph.D.
Li Li, Ph.D., DABT
Wendy Budin, Ph.D., RN-BC
Brian Pachkowsk, Ph.D.
Karen Pawlish, M.P.H., Sc.D.
Jonathan Yavelow, Ph.D.

**NJCCR Office**

New Jersey Department of Health
Office of Research Initiatives
25 South Stockton Street, 2nd floor
Trenton, NJ 08625

**NJCCR Contact:** 609 913-5008
**Website:** http://nj.gov/health/ccr/index.shtml

**ACKNOWLEDGEMENTS**

The New Jersey Commission on Cancer Research would like to express its sincere appreciation to all present and past Commission members, the New Jersey Department of Health, Cancer Registry Staff and Jennifer Sullivan, Esq. NJCCR Consultant.
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did You Know</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Our Mission</td>
<td>5</td>
</tr>
<tr>
<td>Our Goals</td>
<td>6</td>
</tr>
<tr>
<td>Membership and Organization</td>
<td>7</td>
</tr>
<tr>
<td>Background</td>
<td>9</td>
</tr>
<tr>
<td>Burden of Cancer</td>
<td>11</td>
</tr>
<tr>
<td>Cancer Disparities by Race/Ethnicity</td>
<td>13</td>
</tr>
<tr>
<td>Why State Funding Matters</td>
<td>15</td>
</tr>
<tr>
<td>Grants and Fellowships</td>
<td>19</td>
</tr>
<tr>
<td>2018 Pre- and Post-Doctoral Fellowships and Bridge Grants</td>
<td>20</td>
</tr>
<tr>
<td>2019 Pre- and Post-Doctoral Fellowships and Bridge Grants</td>
<td>22</td>
</tr>
<tr>
<td>Cancer Discoveries</td>
<td>25</td>
</tr>
<tr>
<td>NJ Cancer Research Symposium 2018</td>
<td>27</td>
</tr>
<tr>
<td>NJ Cancer Research Symposium 2019</td>
<td>28</td>
</tr>
<tr>
<td>Conclusion</td>
<td>31</td>
</tr>
<tr>
<td>Commission Membership Bios</td>
<td>33</td>
</tr>
<tr>
<td>Commission Members in the News</td>
<td>37</td>
</tr>
</tbody>
</table>

The New Jersey Commission on Cancer Research (NJCCR) promotes significant and original research in New Jersey into the causes, prevention and treatment of cancer and serves as a resource to providers and consumers of cancer services.
New Jersey is ranked 5th in the nation in the incidence of cancer.¹

But is ranked in the bottom half among all the states for cancer deaths in the U.S.²

An estimated 53,260 people in New Jersey were diagnosed with cancer in 2018, and 16,040 succumbed to the disease, according to the American Cancer Society’s report “Cancer Facts & Figures 2018³”.

The New Jersey Commission on Cancer Research (NJCCCR) promotes significant and original research into the causes, prevention and treatment of cancer and serves as a resource to providers and consumers of cancer services.

The Commission was founded by legislation in 1983, (Cancer Research Act, P.L. 83, Ch.6) to promote and fund significant cancer research projects proposed and carried out by New Jersey scientists. The Act dictates that the NJCCCR receive no less than $1 million annually for research into the causes, prevention and treatment of cancer.⁴

Since 1983, the NJCCCR has awarded more than $43 million for over 850 peer-reviewed cancer research grants and student fellowships to support discovery-oriented basic science cancer research.

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¹ U.S. Cancer Statistics Working Group, United States Cancer Statistics Data Visualizations: Leading Cancer Cases and Deaths, Male and Female, 2016, Atlanta (GA), Department of Health and Human Services, Centers for Disease Control and Prevention. Available at: https://gis.cdc.gov/cancer/USCS/DataViz.html

² U.S. Cancer Statistics Working Group, United States Cancer Statistics Data Visualizations: Leading Cancer Cases and Deaths, Male and Female, 2016, Atlanta (GA), Department of Health and Human Services, Center for Disease Control and Prevention. Available at: https://gis.cdc.gov/cancer/USCS/DataViz.html


⁴ In 2012 the New Jersey Commission on Cancer Research did not receive an annual appropriation. The $1 million appropriation was restored in 2013. In 2018, the state appropriation was doubled to $2 million.
Introduction

The New Jersey Commission on Cancer Research, also known as the Cancer Research Act, P.L. 83, Ch.6 was established in 1983 to promote and fund cancer research projects to individual scientists at academic and research institutions.

- Since 1983, the NJCCR has awarded more than $43 million for over 850 peer reviewed cancer research grants.
- Progress made by researchers has been presented in abstracts, scientific conferences, symposia, and meetings.
- Commission programs have facilitated wider scientific interaction and numerous active research collaborations, along with out-of-state researchers.
- Success in achieving Commission funding has resulted in academic and career advance for New Jersey researchers, including doctoral dissertations.

This report is written in accordance with the enabling Statue, which stipulates that the NJCCR shall provide a report to the Governor and Legislature on the status of the Commission’s activities and results of its funded research efforts. A copy of the Statute is attached hereto as Appendix 1.

The Cancer Research Act created the New Jersey Commission on Cancer Research to support its activities. This Act resulted from the collaborative efforts of people with cancer and their families, clinicians, academicians, scientists, public officials, and representatives of research, pharmaceutical industry and non-profit organizations. This Act dictates that the NJCCR receives no less than $1 million annually for research into the causes, prevention and treatment of cancer.
Our Mission

To ensure that the citizens of New Jersey receive the fullest benefit of our nation’s fight against cancer through the promotion and funding of research into the causes, prevention and treatment of cancer.

Commission Members, Department of Health staff and guests.

Commission Members, Department of Health staff and guests.
Our Goals

Simply stated, the Commission’s goals are:

- To support meritorious research projects that advance the understanding of prevention, diagnosis, treatment and survivorship of cancer.
- To support the progression of research from bench to bedside.
- To enhance the reputation of New Jersey as a leader in the field of cancer research.
- To facilitate the initiatives of New Jersey scientists to larger grants from sources such as the National Institutes of Health and
- Provide funding to promising and productive investigators who experience a short-term interruption in funding for research projects focused on cancer prevention, diagnosis, treatment and survivorship.

More specifically, the Commission works to:

- Advance the field of scientific cancer research in New Jersey by encouraging established scientists to apply their expertise to cancer research.
- Foster collaborative, interdisciplinary approaches to cancer research.
- Nurture future generations of cancer researchers by supporting young scientists and pre-and post-doctoral fellows.
- Disseminate the research findings generated by scientists at the Commission’s annual symposium and
- Compile a directory of all cancer research projects in the State.
Membership and Organization

Created as a semi-independent public body, the Commission is “...allocated in, but not of...” the New Jersey Department of Health. The Commission is subject to all the administrative rules and procedures of the Department, but is not a part of the Department’s budget. The Commission receives a state appropriation to facilitate its mission aimed at promoting and advancing cancer research in New Jersey.

The Commission establishes and oversees the administrative operations of the grant-making process as well as other programmatic activities that are implemented by its administrative staff. Eleven uncompensated members, including the Commissioners of the New Jersey Department of Health, the Department of Environmental Protections or their appointed designees, and nine citizens of New Jersey are appointed by the Governor and with the advice and consent of the Senate serve a three-year term.

New Jersey residents wishing to be considered for appointment may submit his or her name to the Governor’s Office of Appointments. Information on how to apply can be found at: https://www.nj.gov/governor/admin/bca.
Background

There were 598,031 people that died from cancer in the United States and 1,658,716 new cases reported that same year. For every 100,000 persons, 436 new cancer cases were reported and 156 died of cancer. Cancer remains the second leading cause of death in the United States, exceeded only by heart disease. One of every four deaths in the United States is due to cancer.

Cancer is the 2nd leading cause of death in New Jersey with 51,521 new cases reported in 2016. For every 100,000 persons 475 cancer cases were reported and, in the same year 16,377 died of cancer. In 2020 estimates suggest that 53,340 persons will be diagnosed with cancer and 15,710 will die due to cancer.

It is difficult to find anyone in New Jersey who has not been touched by cancer in some way. Our state consistently ranks among the top ten nationally in the incidence of cancer. Incidence refers to the number of newly diagnosed cases during a specific time period. The extent of occurrence or incidence rate of cancer varies by age, sex and ethnicity. In 2016, it was ranked 5th in the incidence of cancer in the U.S. by the Centers for Disease Control and Prevention (CDC) Cancer Statistics Working Group. The cost of this disease is measured in human suffering, in lives lost, lives potentially wasted, and huge medical costs.

It is hard to imagine that each year, nearly 100,000 New Jersey residents learn they have cancer, and around 16,000 succumb to the disease, making it the second leading cause of death in the state. From 2011 through 2015, a total of 251,548 cases of invasive cancer were diagnosed among New Jersey residents; 50.7% women; 49.3% men; 81.9% whites, 11.2% blacks, and 4% Asians or Pacific Islanders. Hispanics of any race accounted for 9.3% of the total cancer cases.

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   https://gis.cdc.gov/Cancer/USCS/DataViz.html
2 Ibid.
3 Ibid.
6 Ibid.
The most common cancer diagnosed among New Jersey women in 2015 was breast cancer, followed by lung and bronchus cancer (Table 1). However, lung and bronchus cancer was the leading cause of cancer related death among males (Table 4). For women, colon and rectum was the third most common cancer diagnosed in 2015, as well as the third leading cause of death from cancer.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cancer Site</th>
<th>Rate^</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Breast</td>
<td>134.8</td>
<td>7,582</td>
</tr>
<tr>
<td>2</td>
<td>Lung and Bronchus</td>
<td>51.2</td>
<td>3,081</td>
</tr>
<tr>
<td>3</td>
<td>Colon and Rectum</td>
<td>34.4</td>
<td>2,026</td>
</tr>
<tr>
<td>4</td>
<td>Corpus and Uterus, NOS</td>
<td>31.3</td>
<td>1,893</td>
</tr>
<tr>
<td>5</td>
<td>Thyroid</td>
<td>27.7</td>
<td>1,355</td>
</tr>
<tr>
<td>6</td>
<td>Non-Hodgkin Lymphoma</td>
<td>18.5</td>
<td>1,069</td>
</tr>
<tr>
<td>7</td>
<td>Melanoma of the Skin</td>
<td>18.1</td>
<td>1,008</td>
</tr>
<tr>
<td>8</td>
<td>Pancreas</td>
<td>12.5</td>
<td>761</td>
</tr>
<tr>
<td>9</td>
<td>Ovary</td>
<td>12.2</td>
<td>698</td>
</tr>
<tr>
<td>10</td>
<td>Urinary Bladder</td>
<td>10.7</td>
<td>659</td>
</tr>
</tbody>
</table>

*Rate^ are per 100,000 and age-adjusted to the 2000 US population standard.
*2015 data are preliminary. NOS = not otherwise specified.

Mortality refers to the total number of deaths in a given population. Data comparisons show that the mortality rate of cancer for males is somewhat higher than females. The table below shows the rate of cancer deaths for females in New Jersey.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cancer Site</th>
<th>Rate^</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All Sites</td>
<td>133.5</td>
<td>8,193</td>
</tr>
<tr>
<td>2</td>
<td>Lung and Bronchus</td>
<td>30.5</td>
<td>1,888</td>
</tr>
<tr>
<td>3</td>
<td>Breast</td>
<td>21.0</td>
<td>1,272</td>
</tr>
<tr>
<td>4</td>
<td>Colon and Rectum</td>
<td>11.5</td>
<td>728</td>
</tr>
<tr>
<td>5</td>
<td>Pancreas</td>
<td>10.3</td>
<td>639</td>
</tr>
<tr>
<td>6</td>
<td>Ovary</td>
<td>6.7</td>
<td>411</td>
</tr>
<tr>
<td>7</td>
<td>Corpus and Uterus, NOS</td>
<td>5.4</td>
<td>336</td>
</tr>
<tr>
<td>8</td>
<td>Leukemia</td>
<td>4.5</td>
<td>275</td>
</tr>
<tr>
<td>9</td>
<td>Non-Hodgkin Lymphoma</td>
<td>4.1</td>
<td>249</td>
</tr>
<tr>
<td>10</td>
<td>Brain and Other Nervous System</td>
<td>3.4</td>
<td>187</td>
</tr>
<tr>
<td>11</td>
<td>Urinary Bladder</td>
<td>2.6</td>
<td>171</td>
</tr>
</tbody>
</table>

*Rate^ are per 100,000 and age-adjusted to the 2000 US population standard. NOS = not otherwise specified.
The most common cause of cancer diagnosed among New Jersey men in 2015 was prostate cancer, but lung and bronchus cancer was the leading cause of cancer related death, followed by colon, rectum and prostate cancer (Tables 3 & 4). Lung and bronchus cancer was the second most common cancer diagnosed in men in 2015, and colon and rectum cancer was the third most common cancer.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cancer Site</th>
<th>Rate^</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prostate</td>
<td>127.2</td>
<td>6,527</td>
</tr>
<tr>
<td>2</td>
<td>Lung and Bronchus</td>
<td>61.0</td>
<td>2,846</td>
</tr>
<tr>
<td>3</td>
<td>Colon and Rectum</td>
<td>47.9</td>
<td>2,280</td>
</tr>
<tr>
<td>4</td>
<td>Urinary Bladder</td>
<td>40.8</td>
<td>1,881</td>
</tr>
<tr>
<td>5</td>
<td>Melanoma of the Skin</td>
<td>28.2</td>
<td>1,341</td>
</tr>
<tr>
<td>6</td>
<td>Non-Hodgkin Lymphoma</td>
<td>26.8</td>
<td>1,230</td>
</tr>
<tr>
<td>7</td>
<td>Kidney and Renal Pelvis</td>
<td>22.4</td>
<td>1,078</td>
</tr>
<tr>
<td>8</td>
<td>Leukemia</td>
<td>19.8</td>
<td>903</td>
</tr>
<tr>
<td>9</td>
<td>Oral Cavity and Pharynx</td>
<td>16.0</td>
<td>808</td>
</tr>
<tr>
<td>10</td>
<td>Pancreas</td>
<td>15.7</td>
<td>734</td>
</tr>
</tbody>
</table>

^Rates are per 100,000 and age-adjusted to the 2000 US population standard.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cancer Site</th>
<th>Rate^</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lung and Bronchus</td>
<td>41.1</td>
<td>1,891</td>
</tr>
<tr>
<td>2</td>
<td>Colon and Rectum</td>
<td>17.3</td>
<td>802</td>
</tr>
<tr>
<td>3</td>
<td>Prostate</td>
<td>17.2</td>
<td>739</td>
</tr>
<tr>
<td>4</td>
<td>Pancreas</td>
<td>13.0</td>
<td>604</td>
</tr>
<tr>
<td>5</td>
<td>Leukemia</td>
<td>8.3</td>
<td>368</td>
</tr>
<tr>
<td>6</td>
<td>Urinary Bladder</td>
<td>8.1</td>
<td>351</td>
</tr>
<tr>
<td>7</td>
<td>Liver</td>
<td>6.9</td>
<td>339</td>
</tr>
<tr>
<td>8</td>
<td>Non-Hodgkin Lymphoma</td>
<td>7.5</td>
<td>326</td>
</tr>
<tr>
<td>9</td>
<td>Esophagus</td>
<td>6.3</td>
<td>299</td>
</tr>
<tr>
<td>10</td>
<td>Brain and Other Nervous System</td>
<td>4.8</td>
<td>233</td>
</tr>
</tbody>
</table>

^Rates are per 100,000 and age-adjusted to the 2000 US population standard.
The mortality rates vary considerably between racial and ethnic groups, largely due to inequalities in wealth that lead to differences in risk exposures and barriers to access high-quality prevention, early detection and treatment. Among females, blacks have the highest death rate at 146.3 compared to white females who rank second at a rate of 140.5. The mortality disparity among males is larger, with a death rate of 205.2 for blacks compared to 176.4 white males.

Overall cancer mortality is continuing to decline. This steady decline is due to reductions in smoking and subsequent declines in lung cancer mortality, which have accelerated in recent years. However, investments in basic and clinical research have undoubtedly accelerated 5-year survival rates and the fight against cancer.

Only by understanding the data, molecular and genetic properties of cancer cells can we understand what causes them to become malignant and how to reverse or prevent these changes. That is why for over 30 years the NJCCR has provided more than $45 million in support of discovery-oriented basic science cancer research; and, has worked closely with experts statewide to achieve significant advances in understanding the cellular and molecular events that lead to cancer.

The U.S. remains a powerhouse of innovation: the National Science Foundation recently reported that federal obligations for research and development increased to an estimated $118.3 billion in FY17, an increase of almost 3% from the previous year. This is great news, however, most research focuses its vast resources on applied over basic research. Basic research or science, sometimes called “pure” or “fundamental” science,
helps researchers understand living systems and life processes. This knowledge leads to better ways to predict, prevent, diagnose, and treat disease.

The past two years have been a remarkable time for cancer research with great strides made in the diagnosis and treatment of various types of cancer, as well as important breakthroughs contributing to the overall health of our increasing numbers of cancer survivors.

The days of using chemotherapy to treat cancers is becoming that of a bygone era. Immunotherapy is seemingly everywhere with several treatments having been approved for various cancer types, including CAR-T Cell therapy, immune checkpoint inhibitors and more in development such as tumor infiltrating lymphocyte therapy.

There is a major role now of personalized cancer treatment with the use immune checkpoint/blocking drugs such as those which target PD-1 or CTLA-4, where the treatments are directed at the cancer. Major breakthroughs have occurred for lung cancer, head and neck cancers, breast cancer, leukemias and lymphomas.

Use of a liquid biopsy where a simple blood test is used to diagnosis cancer has had major breakthroughs over the past two years. There has been a major focus on the side effects of cancer treatment and with more cancer survivors, the issues of long-term side effects are now being addressed.

There is a major attempt to improve access to cancer care, and also to address the issues of the marked healthcare disparities that exist across our state as well as our country.

We at the Commission remain very optimistic that with our research funding support, we will be able to contribute to finding the best determinants for the causes, prevention and treatment of the many different types of cancer.

Since its inception, the Commission has committed the vast majority of its funding to basic cancer research. Our strategy has been to provide the most promising proposals with seed money, and to support research fellowships, as they embody creative new studies into the causes, prevention and treatment of cancer.
Economic Changes

As with many other states across the country, New Jersey now faces an unprecedented economic crisis; an economic restructuring based on global competition, technological advancements, and health care reform. These are structural changes that are not temporary, and require new approaches to establish and maintain economic stability in an economy that is forever changing. So, why should its citizens continue to fund cancer research during such difficult times? For an increasing number of people, a diagnosis of cancer in no longer a death sentence. In recent years, statistics have shown that the death toll from some of the most common cancers has dropped to its lowest levels, and survival rates continue to climb. Currently, there are over 16.9 million cancer survivors living in the United States, almost 5% of the population.

These outcomes have been possible thanks in no small part to the efforts of the thousands of cancer researchers and doctors who have dedicated their lives to beating this disease.

Scientific research into cancer does make a difference. New Jersey is proud to be leading the way in the fight.

Strengthening New Jersey Institutions in World-Class Research

University-based research strengthens the recipient institutions. World-class research institutions such as Rutgers and Princeton Universities

Research from investigators at the Rutgers Cancer Institute of New Jersey show that autophagy, a mechanism involving degradation of damaged or unnecessary components, in normal tissues as well as the tumor cells themselves, promotes tumor growth. Autophagy in the liver prevents the release of the enzyme arginase 1 from the liver to the circulation. These enzymes then degrade the circulating arginine that is essential for tumor growth. Thus, autophagy maintains an important tumor nutrient, arginine, in the blood supply, identifying a metabolic vulnerability of cancer. The work, which appears in the November 14th, 2018 online issue of Nature (DOI: 10.1038/s41586-018-0697-7), argues that cutting off the supply of essential tumor nutrients is an important therapeutic approach to cancer therapy that remains to be further exploited.

The study’s lead author is, Rutgers Cancer Institute researcher, Laura Poillet Perez, PhD, a 2016 post-doctoral cancer research fellowship

6 National Cancer Institute, Division of Cancer Control & Population Sciences. Available at: https://cancercontrol.cancer.gov/ocs/statistics/statistics.html
attract highly talented students and faculty. Healthy growing academic institutions bolster New Jersey’s economy.

New Jersey’s cancer research enterprise extends beyond the laboratory and campus. NJCCR research funding augments New Jersey’s reputation as “the world’s medicine chest.” Our state has one of the highest concentrations of pharmaceutical and biotechnology industries in the country—New Jersey boasts more than 400 biotech companies, 3,300 life science companies, and more than half of the top 20 research based biopharma companies. Also, more than half of the top 20 medical tech companies in the world call New Jersey their global, North American or U.S. headquarters. The ability of this industry to tap New Jersey’s cancer research talent as well as its research breakthroughs bolsters its strength and in turn New Jersey’s economy.

**Economic Outcomes of Research**

- NJCCR has provided more than $43 million in discovery-oriented cancer research grants in its 30-year history. Our research grant recipients have, in turn, brought to New Jersey research laboratories millions of dollars in federal financial support. An independent evaluation of the NJCCR by the Edward J. Bloustein School of Public Policy at Rutgers has shown that the NJCCR represents one of New Jersey’s great success stories in terms of public investment in cancer research.

- NJCCR grant recipients bring back $10.44 for every state dollar awarded in new research dollars to New Jersey. Indirect costs to the institution increase this amount even more.

- More than 85% of NJCCR grant recipients go on to obtain major national grants within 4 years of their NJCCR award. This is 4X better than national averages for scientists with new applications to major funding agencies.

- 8 out of 10 new scientists without any track record or grant history get major national grants within 4 years of their first NJCCR award.

**Funding**

Aside from the annual $1 to $2 million state budget appropriation, the NJCCR receives funding from two other sources: sale of the “Conquer Cancer” license plate, and state income-tax check-offs for breast, prostate, and lung cancers.

7 NJBIZ, Anthony Vecchione, “Still the Medicine Chest of the World,” August 12, 2019
Conquer Cancer License Plate

The Conquer Cancer specialty license plate is making good on its promise to “take the fight against cancer to the streets of New Jersey”. Since its inception in 1998, over 63,000 license plates have been sold and more than $5.7 million dollars have been raised for cancer research in the state.

In Fiscal Year 2018, more than 16,000 plates were sold or renewed. When the proceeds from these sales were combined with renewal fees, more than $208,000 was raised for cancer research. New Jersey motorists can purchase the plate at any time during the registration cycle for $50, with a $10 annual renewal fee, at all Motor Vehicle Commission offices or through its website: https://www.state.nj.us/mvc/vehicles/conquer.htm

In Fiscal Year 2019, $574,709.22 was raised from Conquer Cancer proceeds.

New Jersey Breast, Prostate & Lung Cancer Research Funds

The NJCCR administers targeted funds for cancer research. The New Jersey Breast Cancer Research Fund (BCRF) was created in 1995. The Prostate Cancer Research Fund (PCRF) was initiated online as recently as 2012, creating support for prostate cancer research. All four designated support vehicles are replenished through individual contributions and a check-off box on the New Jersey State Income Tax Return, which allows citizens to voluntarily contribute a portion of their income tax refund or payment.

These designated funds support breast, prostate, and lung cancer research.
grants and fellowships, as well as cancer educational programs. Through a
competitive scientific peer review process, the NJCCR makes awards for
research projects focusing on the causes, prevention, screening, treatment
or cure of these cancers. Grants may also be awarded to support basic,
behavioral, clinical, demographical, epidemiological and psychosocial
research.

The following funds were raised in 2018 and 2019:

<table>
<thead>
<tr>
<th>Research Funds</th>
<th>Raised in Tax Year 2018</th>
<th>Raised in Tax Year 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Jersey Breast Cancer Research Fund</td>
<td>$ 210,239</td>
<td>$ 572,329</td>
</tr>
<tr>
<td>New Jersey Prostate Cancer Research Fund</td>
<td>$ 43,392</td>
<td>$ 13,376</td>
</tr>
<tr>
<td>New Jersey Lung Cancer Research Fund</td>
<td>$ 10,721</td>
<td>$ 17,782</td>
</tr>
</tbody>
</table>

Breast Cancer  Prostate Cancer  Lung Cancer
The NJCCR funds research projects that focus on the genetic, biochemical, viral, microbiological, environmental, behavioral, socioeconomic, demographic and psychosocial aspects of cancer prevention, causes, development, treatment and palliation. Such research may include studies that relate to fundamental aspects of cancer; however, these projects must include biologic systems, tissues, cells, human subjects and/or other materials that have a direct relationship to cancer.

The NJCCR offers Pre- and Post-Doctoral Fellowships to trainees at New Jersey non-profit research institutions with formally established and active graduate research programs. Candidates must apply for a fellowship under the guidance of a Sponsor—a scientist (tenured, tenure-track or equivalent position) capable of providing mentorship to the Fellow. In addition to aiding in the planning, execution and supervision of the proposed research, the Sponsor’s role is to foster the development of the Fellow’s overall knowledge, technical and analytical skills, and capacity for scientific inquiry. The Sponsor is also expected to assist the Fellow in attaining his/her career goals. Awards are made to institutions for the support of the trainee under direct supervision of the Sponsor. A Sponsor is only eligible to mentor one NJCCR pre- or post-doctoral research trainee at any one time.

With $2 million in funding in 2018, the NJCCR was able to award 21 two-year cancer research fellowships totaling over $1.6 million, to the following scientists in New Jersey research institutions. In addition, the Commission was able to fund 4 bridge grant recipients, allowing established researchers to continue their vital research with no interruption in funding. Similarly, in 2019, the NJCCR was able to award 24 two-year cancer research over $1.7 million to scientists in New Jersey research institutions.

Purpose of Fellowships: 2018-2019

**Pre- and Post-Doctoral Fellowships** support young scientists who conduct original basic, biomedical, behavioral or clinical science research related to the causes, prevention, survival and treatment of cancer.
Purpose of Bridge Grants: 2018-2019

The Bridge Grants enhance cancer-related research at New Jersey institutions by providing funding to promising and productive investigators who anticipate a short-term interruption in funding for research projects focused on cancer prevention, diagnosis, treatment and survivorship. The goal of the program is to strengthen the competitive position of faculty members whose extramural grant applications were reviewed and scored highly but were not funded.

2018 Grants and Fellowships

Pre-Doctoral Fellowships—2018

Bahar Javdan, Princeton University
Investigating the Impact of Human Gut Microbiome on the Metabolism of Oral Cancer

Carly Garrison, Princeton University
Modulating the Alignment of Extracellular Matrix Fibrils to Control Tumor Cell Invasion

Marc Brillantes, Rutgers, the State University of NJ
Regulation of Natural Killer Cell Expansion in Anti-Tumor Immunity

Benjamin Winer, Princeton University
Characterizing the Molecular Determinants of Viral Hepatitis Induced Liver Cancer

Caitlyn Moore, Rutgers Cancer Institute of NJ
The Role of Perivascular Bone Marrow Microenvironment in Breast Cancer Dormancy

Hary Hurley, Rutgers NJ Medical School
Metabolic Regulation of Tumor Immunosurveillance

Jui Wan Loh, Rutgers the State University of NJ
Investigating Clonal Dynamics of Chronic Lymphocytic Leukemia under Targeted Therapy

Unnati Chauham, Rutgers Cancer Institute of NJ
New tRNAses for Cancer Treatment

Joseph Bulatowicz, Rutgers Cancer Institute of NJ
Cell Stress and Metastasis in Breast Cancer
Post-Doctoral Fellowships—2018

**Andreas Kourouklis, Princeton University**

YAP-regulated Metastasis in Engineered Human Breast Tumors Integrated with Interstitial Fluid Pressure

**Anshuman Panda, Rutgers Cancer Institute of NJ**

Mechanisms and Biomarkers of Response to Immune Checkpoint Therapy

**Khoosheh Kayati, Rutgers, the State University of NJ**

Targeting Creatine Kinase Metabolism to Improve Kras-driven Lung Cancer Treatment

**Akshada Sawant, Rutgers Cancer Institute of NJ**

Identifying Mechanisms by which Tumors with High Mutation Burden Respond to Immunotherapy

**Lei Chen, Rutgers, the State University of New Jersey**

Mechanisms Controlling Colorectal Oncogenesis by the Transcription Factor HNF4

**Fenfang Chen, Princeton University**

Identification and characterization of Novel Long Non-Coding RNAs in TGFb Signaling

**Ning Ang Liu, Rutgers Cancer Institute of NJ**

Role of 53BP1 in the Development and Therapy of BCCIP Deficient Breast Cancer

**Shashikala Sasidharan, Rutgers the State University of NJ**

Regulations of Cadherin Trafficking to Apical Junctions Requires Branched Actin Regulator

**LiFeng Yang, Princeton University**

Mitochondrial Serine Catabolism Regulates NADH Pool in and Arrest Mitochondrion

**Zhihau Kang, Rutgers Cancer institute of NJ**

Understanding the Mechanisms of BRCA2 in DNA Replication and Cell Cycle Checkpoints

**Kubra Karagos, Rutgers Cancer Institute of NJ**

ADNP is an Essential Driver of High Grade Serous Ovarian Cancer

**Jennah Sontag, Rutgers the State University of NJ**

Using Digital Media to Increase Effectiveness of Communication about Tobacco Cessation and Harm-Reduction Strategies for Adult Smokers Living with Children
Bridge Grants—2018

Dr. Carol Lutz, Rutgers Biomedical and Health Sciences, NJ Medical School
Modulation of Arachidonic Acid Signaling Molecules Results in Widespread Biochemical and Phenotypic Changes in Lung Cancer Cells

Dr. Zhaohui Feng, Rutgers Cancer Institute of NJ
Targeting Mutant p53 Accumulation and Gain-of-Function in Cancer

Dr. X.F. Steven Zhang, Rutgers Cancer Institute of NJ
MAF1 in Hepatocellular Carcinoma Pathogenesis and Therapy

Dr. Estela Jacinto, Rutgers RWJ Medical School
Mechanisms of Tumorigenesis via mTORC2

2019 Grants and Fellowships

Pre-Doctoral Fellowships—2019

Judy Du, Princeton University
Systematic Detection of Oncogenic TAD Disruption Across Cancer Types

Kevin Lahey, Rutgers Biomedical and Health Sciences
Cell Surface Merk Regulation and its Role in the Immune Checkpoint Blockade

Juliet Gardiner, Rutgers Biomedical and Health Sciences
Issue-Specific Tumorigenesis in Multiple Endocrine Neoplasia Type 1

Vrushank Bhatt, Rutgers Biomedical and Health Sciences
Targeting Autophagy to Improve the Efficacy of Immunotherapy in Liver Kinase B1 (LKB1)-deficient Non-Small Cell Lung Cancer (NSCLC)

Kevinn Eddy, Rutgers, the State University of New Jersey
Preclinical Study Using Trigriluzole and anti-PD-1 in a Spontaneous Transgenic Melanoma Mouse Model

Juan Flores, Rutgers, the State University of New Jersey
Role of Rab11a in Cancer Progression

Lianna Schwartz-Orbach, Rutgers the State University of New Jersey
The Role of a Novel Heterochromatin Mark, H3K23me, in Transgenerational Epigenetic Inheritance in C. Elegans and as a Potential Biomarker for Cancer
Alexandra Liddane, Rowan University
Emerin Regulation of Nuclear Structure in Invasive Breast Cancer Cells

Post-Doctoral Fellowships—2019

Ramesh Gunaratna, Princeton University
The Role of DACT1 in Bone Metastasis of Breast Cancer

Maria Victoria da Silva, Rutgers Biomedical and Health Sciences
The Role of Glutaminolysis in T-ALL

Elisa Lazzari, Hackensack University Medical Center
Targeting the Bone Marrow Vascular Niche to Eradicate Leukemia Stem Cell Protective Micro Environment

Tzeh Keong Foo, Rutgers Biomedical and Health Sciences
Functional Characterization of a Novel BRCA1 Phosphorylation Site in the DNA Damage Response and Tumorigenesis

Hongwu Qian, Princeton University
Structural and Biochemical Investigation of Tumor Suppressor Patched1 in Hedgehog Pathway

Nidhi Jariwala, Rutgers Biomedical and Health Sciences
Targeting Fatty Acid Oxidation by Inhibiting CPT1A as a Potential Therapeutic Strategy Against ER+ Breast Cancer

Saurabh Laddha, Rutgers Biomedical and Health Sciences
Single Cell Genomic Study of MEN1 Knockout Pancreatic Neuroendocrine Tumors

Nahed Jailoul, Rutgers Biomedical and Health Sciences
Bioinformatic Analysis of Clinical Sequencing Data for Interpreting Tumor Mutations

Zhaomeng Niu, Rutgers Biomedical and Health Sciences
Identifying Optimal Educational Methods to Teach Early Detection Skills During Skin Self-examination Among Individuals at Risk for Melanoma

Yuan Wang, Rutgers Biomedical and Health Sciences
Functional Characterization of SETD4 in Cancer Development
Bridge Grants–2019

**Dr. Rena Feinman, Hackensack University Medical Center**
The Gut Microbiomoe and Responses to Consolidations Immunotherapy in High-Risk Multiple Myeloma after Autologous Transplantation

**Dr. Yuri Bushkin, Rutgers University, NJ Medical School**
Single-molecule RNA Detection Technology to Distinguish Disease and Normal Plasma Cells in Myeloma

**Dr. Ping Xie, Rutgers, the State University of New Jersey**
Regulatory Mechanisms of the Tumor Suppressor TRAF3 Expressed in Myeloid Cells

**Dr. Karen Edelblum, Rutgers University, NJ Medical School**
Interferon Regulation of γδ Intraepithelial Lymphocyte Activation
Commission Chair Emerita Dr. Anna Marie Skalka Publishes a New Book: Discovering Retroviruses: Beacons in the Biosphere

Discovering Retroviruses
Beacons in the Biosphere
Anna Marie Skalka

“Discovering Retroviruses takes the reader on a remarkable historical voyage from the earliest appearance of life on earth to the present day. Students will not find a better way to learn the basic history of molecular biology and virology. Experts will find Skalka’s unraveling of how and why retroviruses are ‘beacons in the biosphere’ to be fresh, compelling, insightful, and thought-provoking. This book showcases Skalka’s passion and excitement for science.”

—Lynn W. Enquist, Princeton University

Approximately eight percent of our DNA contains retroviral sequences that are millions of years old. Through engaging stories of scientific discovery, Anna Marie Skalka explains our evolving knowledge of these ancient denizens of the biosphere and how this understanding has significantly advanced research in genetic engineering, gene delivery systems, and precision medicine.

Discovering Retroviruses begins with the pioneer scientists who first encountered these RNA-containing viruses and solved the mystery of their reproduction. Like other viruses, retroviruses invade the cells of a host organism to reproduce. What makes them “retro” is a unique process of genetic information transfer. Instead of transcribing DNA into RNA as all living cells do, they transcribe their RNA into DNA. This viral DNA is then spliced into the host’s genome, where the cell’s synthetic machinery is co-opted to make new virus particles. The 100,000 pieces of retroviral DNA in the human genome are remnants from multiple invasions of our ancestors’ “germline” cells—the cells that allow a host organism to reproduce. Most of these bits of retroviral DNA are degenerated fossils, but some have been exploited during evolution, with profound effects on our physiology.

Some present-day circulating retroviruses cause cancers in humans and other animals. Others, like HIV, cause severe immunodeficiencies. But retroviruses also hold clues to innovative approaches that can prevent and treat these diseases. In laboratories around the world, retroviruses continue to shed light on future possibilities that are anything but "retro."

Anna Marie Skalka is Professor Emerita at the Fox Chase Cancer Center in Philadelphia.
The NJ Commission on Cancer Research held its third Cancer Research Symposium at Rider University on November 9, 2018. The Symposium featured the work of its most recent pre- and post-doctoral fellowship recipients, and honored NJ Assembly Majority Leader Lou Greenwald, Sister Maggie Lopez and the American Cancer Society, and Phyllis Salowe-Kaye for their work in support of the Commission. The keynote speaker was Dr. Arnold J. Levine, a world-renowned molecular biologist and Professor Emeritus of the Institute for Advanced Study in Princeton.
The 4th Annual Cancer Research Symposium was held on Thursday, November 7th at Rider University. The keynote address was given by Dr. Arnold Rabson, Director of the Child Health Institute of NJ and Laura Gallagher Endowed Chair of Developmental Biology at the Rutgers Robert Wood Johnson Medical School.

Current fellowship recipients were able to present posters on their research, and Dr. Candido Africa was honored upon his retirement for his 20 plus years of service to the NJ Department of Health and the Commission. In addition, NJ Senate President Sweeney was presented with the Legislative Champion Award (accepted by Alison Accettola, General Counsel of the Senate Majority Office), Dr. Michael Gallo was presented with the Research Award, and Debby Madiraca received the Patient Advocate Award.

Congratulations to all!
NJ Cancer Research Symposium 2019 continued

Dr. Arnold Rabson, keynote speaker

Alison Accettola and Dr. Kenneth Adler

Dr. Michael Gallo and Dr. Kathleen Scotto

Debby Madiraca, the Patient Advocate Awardee
Conclusion

Cancer affects not only the people with the disease, but their families, caregivers and entire communities. People with cancer must contend with the effects of the disease and its treatment on their health, well-being, family and social relationships and economic productivity. Accessing and affording quality healthcare can also be a struggle for many families. Issues related to cancer account for significant allocations of economic resources for communities, public health and healthcare organizations.

The burden of cancer is not distributed evenly. Risks of developing or dying from various cancers such as breast, lung, prostate often differ depending on a person’s race or ethnicity and socioeconomic status. Furthermore, many health disparities are caused by the complex relationships of historical and current policies, experiences and norms affecting where and how people live, work, learn and play. In addition, factors such as economic resources, insurance status, language, geographic location may affect access to prevention, treatment and diagnostic services for cancer. So, why should New Jersey residents continue to fund cancer research during such difficult times? Because cancer research is not only saving lives but paving the way for innovation and development of new therapies and treatment. For an increasing number of New Jersey residents, a diagnosis of cancer is no longer a death sentence. In recent years, statistics have shown that the death toll from some of the most common cancers has dropped to its lowest levels, and survival rates continue to increase. This increase is due to New Jersey’s continued research efforts to accelerate the progress for finding a cure.
Cancer research has transformed and saved lives for all Americans as shown in the chart on the previous page.

These outcomes have been made possible thanks in no small part to the efforts of the thousands of cancer researchers, doctors and healthcare professionals who have dedicated their lives to beating this disease. Scientific research into cancer does make a difference. The NJCCR is proud to be leading the way in the scientific fight against cancer for all.
Commission Membership Bios

Dr. Kenneth Adler (Chair) from 2004 to Present
Dr. Adler specializes in hematology/oncology, with a special interest in benign and malignant hematology and in geriatric oncology. In addition to his role at Summit Medical Group, he is an Assistant Clinical Professor of Medicine at the New Jersey Medical School and Hospice Medical Director at the VNA of Somerset Hills. He is the Co-Chair of the American Society of Hematology Practice and Partnership, and is a fellow of the American College of Physicians, a member of the American Society of Clinical Oncology and the American Society of Hematology. Dr. Adler has been awarded several outstanding honors throughout his career, including most recently in 2014 he received the prestigious Augustus Stone Award for his volunteer service to the Morristown Medical Center, and in 2017 he was the Medical Honoree of the American Cancer Society for Northwest New Jersey.

Dr. Kathleen Scotto (Vice-Chair) – 2010 to Present
Dr. Scotto is currently Vice-Chancellor for Research and Research Training, Rutgers Biomedical and Health Sciences and Vice Dean for the School of Graduate Studies, Rutgers, the State University of New Jersey. She received her Ph.D. from the Cornell Graduate School of Medical Sciences. Prior to joining Rutgers, she served as an Associate Professor of Molecular Pharmacology and Experimental Therapeutics at Memorial-Sloan Kettering Cancer Center and Professor with tenure at the Fox Chase Cancer Center. In addition to her administrative roles, Dr. Scotto maintains an active NIH funded laboratory at Rutgers Cancer Institute of New Jersey.

Dr. Wendy Budin – 2018 to Present
Dr. Wendy Budin is Professor and Associate Dean for the Entry to Baccalaureate Practice at Rutgers School of Nursing. Previously, she was the Director of Nursing Research at NYU Langone Medical Center and faculty at NYU College of Nursing. Dr. Budin is involved in an ongoing program of research on psychosocial adjustment to breast cancer. In 2019, she co-authored a book chapter entitled “Theoretical Frameworks and Philosophies of Care,” in Current Trends in Oncology Nursing-Second Edition. Dr. Budin is a Fellow in the American Academy of Nursing and the New York Academy of Medicine (NYAM). For her achievements she received the NJ Governor's Award for Nursing Research and Distinguished Alumnae awards from the NYU College of Nursing and Seton Hall University, and in 2018 she received the March of Dimes, Nurse of the Year Award for Research.
**Dr. Generosa Grana – 2015 to Present**
Dr. Grana is the Director of the MD Anderson Cancer Center at Cooper. She is also a Professor of Medicine at Cooper Medical School of Rowan University and an Adjunct Professor of Cancer Medicine at The University of Texas MD Anderson Cancer Center. Dr. Grana completed her fellowship in hematology and oncology at Fox Chase Cancer Center and Temple University in Philadelphia where she also completed a post-doctoral fellowship in preventive oncology. Dr. Grana’s clinical and research endeavors at Cooper have focused on breast cancer, cancer genetics and community outreach interventions aimed at underserved populations. She has received numerous awards including the American Cancer Society Silver Chalice Award and the Susan G. Komen for the Cure "Light of Life" Award.

**Dr. Shawna Hudson – 2015 to Present**
Dr. Hudson is Professor and Research Division Chief in the Department of Family Medicine and Community Health at the Rutgers Robert Wood Johnson Medical School. She is a full research member of the Rutgers Cancer Institute of New Jersey in the Cancer Prevention and Control Program, and she also has a secondary faculty appointment in the Rutgers School of Public Health in the Department of Social and Behavioral Health Sciences. She is the co-chair for the Rutgers Biomedical Health Sciences emerging signature program in Community Health and Health Systems. Dr. Hudson is internationally known for her NIH funded research that examines long-term follow-up care for cancer survivors and their transitions from specialist to primary care, and has authored and co-authored numerous research papers and book chapters. In 2018, she received the Excellence in Research Award from the NJ Health Foundation.

**Dr. Li Li – 2015 to Present**
Dr. Li is currently a Director at the Novartis Institute for BioMedical Research, where he has worked for over 13 years. He received his Ph.D. in Toxicology from the University of Texas-Houston School of Public Health. He is a member of the Society of Toxicology and a board certified toxicologist. He is a recipient of numerous awards, most recently the Team Innovation Award from Novartis. In addition, he has co-authored many articles on toxicology innovation in research journals.

**Dr. Karen Pawlish (ad hoc from NJ DOH) – 2012 to Present**
Dr. Pawlish holds both a Sc.D. and M.PH in epidemiology with a focus on cancer epidemiology conducting population-based epidemiologic studies.
at the New Jersey State Cancer Registry (NJSCR). She is currently a co-investigator/NJSCR site study coordinator for the Women’s Circle of Health Study (a population-based case-control study of breast cancer in African American women) and the Epidemiology of Hepatocellular Carcinoma study (a population-based case-control study of liver cancer). She also functions as the New Jersey site study coordinator/co-investigator for the Genome Wide Admixture Scan for Multiple Myeloma in African Americans study (a multi-site case study of multiple myeloma in African Americans).

**Dr. Brian Pachkowski (ad hoc from NJ DEP) – 2016 to Present**

Dr. Pachkowski is a member of the Division of Science and Research at the New Jersey Department of Environmental Protection (DEP) where he is a research scientist who assesses the potential cancer and non-cancer human health effects of chemicals in the environment. Dr. Pachkowski received his doctorate in environmental sciences and engineering from the University of North Carolina at Chapel Hill. Prior to joining the DEP in 2013, he was an Oak Ridge Institute for Science and Education (ORISE) postdoctoral fellow at the US Environmental Protection Agency’s National Center for Environmental Assessment where he participated in the development of human health assessments of environmental contaminants.

**Dr. Anna Marie Skalka (Chair Emerita) - 1983 to Present**

Dr. Anna Marie (Ann) Skalka is Professor Emerita and former W.W. Smith Chair in Cancer Research at the Institute for Cancer Research at the Fox Chase Cancer Center in Philadelphia, where she served as Sr. Vice President for Basic Science from 1987 until 2008. She received a Ph.D. degree in Microbiology from New York University Medical School. Dr. Skalka has also been deeply involved in state, national, and international advisory groups concerned with the broader, societal implications of scientific research, including the NJCCCR, which she chaired from 2008-2013. In recognition of her many research accomplishments; she has been honored by election to the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the New York Academy of Science and the Board of Governors of the American Academy of Microbiology.

**Dr. Jonathan Yavelow – 2010 to Present**

Dr. Yavelow has been a Professor of Biology at Rider University for over 35 years, and a collaborator and member with the NJCCCR since 1984. He received his Ph.D. in Cellular and Molecular Biology from the University
of Southern California, Los Angeles. He previously served as a Visiting Member at the Institute for Advanced Study in Princeton. He also helped to convene and lead the Science Advisory Board at Rider University, from 1990-2010.
In 2017, Commission Vice-Chair, Dr. Kathleen Scotto was appointed Vice-Dean of the Rutgers School of Graduate Studies.

In addition, she is the Chair of the American Association of Cancer Research Committee on Science Education and Career Development. The Committee focuses on cancer (science) education, outreach and enhancement through activities directed at undergraduate and high school levels.

In 2018, Commission Member, Dr. Shawna Hudson was named to the American Society of Clinical Oncology (ASCO) Cancer Survivorship Committee. The Committee’s responsibility is to provide leadership and oversight of the Society’s cancer survivorship activities. The Committee is comprised of 21 members who are experts on cancer survivorship.
More than 85% of NJCCR grant recipients go on to obtain major national grants within 4 years of their NJCCR award. This is 4X better than national averages for scientists with new applications to major funding agencies.

8 out of 10 new scientists without any track record or grant history get major national first NJCCR award.

NJCCR has provided more than $43 million in discovery-oriented cancer research grants in its 30-year history. Our research grant recipients have, in turn, brought to NJ research laboratories millions of dollars in federal financial support.