Research and innovation have long been hallmarks of American higher education. But in the 21st century, knowledge creation is no longer enough. Economic growth depends on translating that knowledge into tangible, measurable benefits—from more patents issued, to more grants won, to more jobs. This shift demands an entrepreneurial mindset—a way of thinking determined to create and shape new markets.

Technology transfer begins when a university scientist, inventor, or student using campus facilities discovers a patentable process or product and discloses the invention to the technology transfer office (TTO). The TTO then evaluates the invention and decides whether to pursue a patent. The TTO of the Research Foundation of State University of New York (RF) offers support services for researchers and businesses that catalyze economic development. It steers discoveries from the university lab bench through the technology transfer, including the patenting process, and assists in creating partnerships with business and industry to further research and license inventions for public use. The RF of SUNY and SUNY campuses hold more than 800 patents, generating more than $18 million in royalties.

Until now, SUNY Geneseo has been a spectator of the SUNY technology transfer enterprise, but recently it ventured into the playing field. Two examples are novel software and an environmentally responsible way to produce a chemical compound. If successful, both these enterprises could produce public goods while netting royalties to our campus, professors, and students.

From Antarctic to Customer Discovery

The spring 2017 issue of The Proposal featured faculty member Glenn McClure’s music innovation after being awarded a fellowship from the National Science Foundation’s (NSF) Artists and Writers program. In Antarctica, McClure recorded ice shelf vibrations and used algorithms to translate the vibrations into music. The idea for a marketable product was pure serendipity. Now McClure has teamed up with Geneseo business student, Christian Burke, Geneseo’s Director of Research, Technology, and Strategic Projects Dr. Kirk Anne, and entrepreneur Phil Wilton to evaluate the product’s commercial potential, made possible by a $50,000 National Science Foundation Innovation Corps-(I-Corps) Teams grant.

The team’s innovative product will translate visually displayed big data into auditory “music.” This technique improves on other forms of data sonification, which often create non-sustainable audio environments dominated by fight-or-flight auditory cues such as beeps, squawks, and alarms. It offers a new, efficacious and aesthetically pleasing tool for trend analysis and anomaly detection for industries such as health, finance, defense, aviation, manufacturing, and security.

The NSF grant sent the team to Washington for training on how to conduct customer discovery. The team met with about 100 potential customers to see if their product, Music in the Numbers, has commercial potential. It does.

From Classroom to Company

Geneseo business students, Drs. Eric Helms and Judith Albers of SUNY Geneseo, Dr. Jacqueline Bennett of SUNY Oneonta, and Dr. Joseph Marasco, chemical industry entrepreneur, teamed up to form a startup company that uses green chemistry to produce imine compounds in an environmentally safe way. Imines are organic compounds with applications in many industries, including pharmaceuticals, agrochemicals, organic light-emitting diodes (OLEDs), and plastics manufacturing. The technology for Verdimine is based on Oneonta Chemistry Professor Bennett’s patented synthetic pathway. Conventional methods of imine production are time and energy consuming and can harm workers’ health and the environment. In contrast, the new technology produces high yield, high purity and high quality imines at a fraction of the time, energy usage, and expense, with greatly reduced threat to workers’ health and the environment.

The formation of this company began in spring 2017 when a team comprised of Geneseo business students, under the guidance of Professor Albers in her VentureWorks program in Geneseo’s School of Business, created a business model (continued on page 4)
Jason Ozubko, Psychology, NIH AREA Grant Recipient

Assistant Professor Jason Ozubko has been awarded a National Institutes of Health (NIH) Academic Research Enhancement Award (AREA) grant to conduct, with undergraduate students, a three-year investigation into the neural and cognitive bases of how people learn to navigate in unfamiliar territory. “The ultimate goal of the project is to decode the ways people build mental maps of their environments and to examine whether the ways people form these maps can be influenced by outside pressures. If the formation of mental maps can be influenced during development, it could eventually lead to interventions or training techniques to help people with navigational difficulties, such as the elderly.”

Dr. Ozubko was inspired by animal research that found that hippocampal place-cells, which track an animal’s position in space while it navigates, replay during periods of quiet wakefulness after a novel environment is experienced. This suggests that animals may be mentally exploring previously traveled spaces, or at least neurally organizing spatial representations according to spatial layout. Dr. Ozubko hypothesizes that in humans cognitive maps can be influenced by having participants selectively reminisce about certain aspects of recent navigation experiences.

Dr. Ozubko created his own software utilizing Google Street View to enable research participants to rapidly and easily learn virtual real-world environments by navigating through them. He will use memory retrieval tasks to affect the kinds of cognitive maps that the participants form and measure indicators of: how confident participants are in their navigation (speed of travel and number of pauses during travel); how much they are planning or re-planning their routes as they travel (decision time at intersections); how efficiently they are using their cognitive maps (directness of travel towards goal); and the degree to which they’ve integrated spatial memories into a cognitive map (number of novel streets taken). A planned extension of the project will perform functional magnetic resonance imaging (fMRI) at the University of Rochester Center for Brain Imaging (RCBI), which will examine the neural representations of space that participants develop.

“My students and I think the combination of virtual navigation using Google Street View with brain imaging could help answer some long standing questions in the field, and my students are looking forward to getting involved in each step of the project.”

Nick Warner, Geological Sciences, NASA’s Mars InSight Mission Grant

A four-year grant from the National Aeronautics and Space Administration (NASA) will support a SUNY Geneseo faculty member’s appointment as a NASA Participating Scientist (equivalent of PI), making him the geology theme leader of the Mars InSight (Interior Exploration Using Seismic Investigations, Geodesy and Heat Transport) mission team with both operational and data analyses responsibilities. InSight is a robotic lander that was launched from California on May 5th. To see the launch, visit https://www.youtube.com/watch?v=NUduq3n.VKyI. InSight is expected to land on the surface of Mars on November 26th. Once there, it will deploy a seismometer and burrow a heat probe.

Assistant Professor of Geological Sciences Nick Warner’s mission team research will help us understand the formation and evolution of Mars and all rocky planets, including Earth. The grant pays for: undergraduate research assistants; travel costs for Dr. Warner to attend pre- and post-launch meetings at the Jet Propulsion Laboratory (JPL); travel to JPL for 58 days of research, beginning with InSight’s landing on Mars; and conference travel support for the PI and students.

The mission will allow Dr. Warner to remotely investigate the geology of the surface and subsurface of Mars and to assess its modern and ancient surface processes. This will build our understanding of the geologic and climate history of the planet. Geologic investigations will play a critical operational role in the mission. As part of the Instrument Site Selection Working Group (ISSWG), Dr. Warner will evaluate landscape morphometry (e.g. slope, relief, rock size) and terrains (e.g. rocks, bedforms, craters) in the ~3.4 m² workspace in front of the lander. The team will determine the terrain and soil/regolith (layer of unconsolidated rocky material covering bedrock) characteristics in the workspace. They will monitor active surface processes, such as wind and dust accumulation, to see how these elements affect instrument operation, lander battery life, and modern surface process rates.

Dr. Warner was chosen, in part, for his past experience at his previous post at JPL. His familiarity with the local geology will be critical for rapid analyses of the workspace. His research will produce high-level data products, including co-registered maps, geospatial data products (e.g. hillshade maps, slope maps), morphometric data, and stratigraphic logs (among others). For more about InSight, visit https://mars.nasa.gov/insight.
Mosaic Knots
Greg Vinal ’19, Amherst, NY
Sponsor: Aaron Heap, Mathematics
WHAT IS YOUR PROJECT?
My project is finding all the prime knot mosaics that fit on a 6x6 grid. Now, that’s a loaded description, but in simpler terms we’re trying to find all the drawings of knotted up loops that can fit onto a grid of a given size. Once we’ve found all the knots for a 6x6 grid, which is the main crux of this research, we hope that we can generalize our program to find all knots on a 7x7 grid and so on. This way, if we were given enough time and computational power, we could find all the knots that could fit on any size grid.

HOW IS YOUR PROJECT FUNDED? My project is funded by the Geneseo Foundation Undergraduate Full-time Summer Fellowship.

WHAT DID YOU HOPE TO GAIN FROM WORKING ON THIS PROJECT? I hoped to get a deeper understanding of knot theory and sharpen up my code writing, which I think I have accomplished.

IS THERE ANYTHING THAT HAS SURPRISED YOU? The one thing that surprised me was how many possibilities there were for knots on a grid. Most computing that I’ve done can be run in a matter of seconds, but the amount of possibilities and computations needed really helped me to appreciate how many possibilities there were and how necessary it was for computers to check the possibilities.

HOW HAS WORKING ON THIS PROJECT IMPACTED YOUR LONG TERM PLANS? My aim is towards graduate school at this point, and I think that this project has helped me to attain that goal as well as give me deeper insights into what math research looks like. This was both substantive and accessible for an undergraduate student.

WHAT HAVE YOU ENJOYED THE MOST? I really enjoyed working with Dr. Heap and doing actual research, which was really gratifying and I enjoyed making math rather than learning about it, so to speak.

WHAT ADVICE DO YOU HAVE FOR OTHER STUDENTS WHO MAY BE INTERESTED IN WORKING ON A RESEARCH PROJECT? I would say that students should talk to their professors and get to know them. They’ve been doing research for a long time and they can help guide you through the difficult aspects of the research.

Motor Degeneration in Aging Mice: A Preliminary Study
Molly Brady ’19, Webster, NY
Sponsor: Dr. Terence Bazzett, Neuroscience
WHAT IS YOUR PROJECT? It is a long-term study spanning several years tracking the learning capacity and eventual decline in the motor skills of mice. We compare different motor tests, including paw-reaching (mice reach a paw through a small hole to grasp and eat sucrose pellets) and grip strength. Paw-reaching is designed to measure fine motor skills, while grip strength measures gross motor skills. We intend to correlate these measures to provide substantial evidence of baseline rates of motor behavior in normal mice in order to compare to diseased mice in further studies. The eventual goal of the project is to eventually test mice with Huntington’s disease using the same procedure, and compare the lower rates of successful motor skills to the baseline decline in normal mice. This paradigm will eventually allow for drug treatments for Huntington’s disease to be tested.

IS THERE ANYTHING THAT HAS SURPRISED YOU? One unexpected finding we have encountered is sex differences in reaching behaviors. We were not expecting to find any differences; however, males tend to reach more often for pellets and have better accuracy than females. More females will not reach at all, and simply sit in the paw-reaching chamber during the test, while most males spend the majority of the time in the chamber trying to access the pellets. We have not performed statistical analyses on these results yet, but the findings have been intriguing all the same.

HOW HAS WORKING ON THIS PROJECT IMPACTED YOUR LONG TERM PLANS? I have realized that I really love working with animals. I find the human brain completely fascinating, but my long-term plans for graduate school have been steered towards translational research and the use of animals in basic scientific studies.

WHAT HAVE YOU ENJOYED THE MOST? I have enjoyed getting practical, real-life experience in a laboratory. Beyond the basic everyday behavioral testing, I have had the responsibility of designing a hypothesis and carrying it out. This involves unexpected barriers which I have had to figure out ways of getting around. This ability to figure out new solutions to the issues in the lab has been invaluable in discovering what the true research process is all about, and thus has prepared me for development of an individual research project for my Honors Capstone.

WHAT ADVICE DO YOU HAVE FOR OTHER STUDENTS WHO MAY BE INTERESTED IN WORKING ON A RESEARCH PROJECT? Don’t be afraid to approach professors early, and invest as much time as possible into research. I have been working in Dr. Bazzett’s lab since I was a freshman, which has enabled me to really engage with the opportunities beyond the basic behavioral testing, such as learning perfusions and staining.
Program Profile: The Fulbright-Hays Seminars Abroad
This program provides opportunities for overseas experience and is open to educators and administrators with responsibilities for curriculum development in fields related to humanities, languages, and area studies. Topics and host countries of the seminars vary from year to year. All seminars are in non-Western European countries. Seminars are designed to provide a broad and introductory cultural orientation to a particular country or countries. The program is geared towards those educators with little or no experience in the host country(ies) who demonstrate the need to develop and enhance their curriculum through short-term study and travel abroad. In 2018 the Postsecondary Seminar offered was titled “Exploring Contemporary United States – Poland Relations.”

Eligible applicants include faculty or administrators from public or private, two- or four-year institutions of higher education whose discipline is related to social sciences, humanities, languages, and/or area studies. Additional eligibility requirements include U.S. citizenship or permanent resident status, at least three years’ professional experience, and full-time employment in a teaching position at an accredited college or university.

Applications include a cover form, CV, letters of reference from the applicant’s current supervisor, and a previous colleague familiar with their work, and three essays on 1) the applicants’ international and/or intercultural experience, 2) demonstrated need/rationale for choice of host country, and 3) curriculum project plan and implementation.

Terms of the award include: (1) round-trip economy airfare; (2) room and board; (3) fees; and (4) program-related travel within the host country(ies). Participants are responsible for a cost share, usually $600 (to defray the costs of the pre-departure orientation), plus travel insurance, inoculations required by the country (if applicable), personal passport and visa costs.

Although the 2019 guidelines and seminar descriptions have not yet been released, last year’s applications were accepted from December 20, 2017 to February 2, 2018. More program information and, when posted, information on the 2019 seminars, may be found on the program web site: https://www2.ed.gov/programs/iegpssap/index.html

Tech Transfer (from page 1)
for the Oneonta professor’s green chemistry technology and entered it in the New York State Business Plan Competition. The team won 2nd place in the Energy and Sustainability track and received $5K to commercialize the technology. Thus, Verdimine, LLC was born. The nascent company was guided by the RF’s Innovation Team to recruit the professors and an entrepreneur. It was selected to participate in the 5th cohort of the High Tech Rochester Nexus-NY program, an I-Corps-type program focused on clean-technology.

Meanwhile, the company worked with the RF to apply for a Technology Accelerator Fund (TAF) grant, which supports innovation across the SUNY research community to accelerate the commercialization of inventions. The TAF grant, with Chemistry Professor Helms is the Principal Investigator, was awarded to Verdimine in spring 2018 to purchase materials, process-scale laboratory equipment, and consulting services to develop samples for prospective customers. Customer discovery and development of scaled-up samples will be carried out by Helms and Geneseo students.

SUNY has encouraged its campuses to offer to all students applied learning opportunities, and the Verdimine TAF project is benefitting SUNY’s mission, Geneseo’s missions and vision, faculty members, and students. It allows the campuses to provide our students with the opportunity to conduct experiments to accomplish commercial-scale (100 gram to kilogram batch) process validation, and learn from and work collaboratively with industry.

SUNY Geneseo and the RF support faculty or staff members who think they may have a patentable invention. If the invention is profitable, the profits are divided between the university, the inventor, and the startup company.

Upcoming Campus Deadlines

Faculty Programs

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<th>Date</th>
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<tr>
<td>Oct. 15</td>
<td>CIEE International Faculty Development Seminar Award</td>
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<tr>
<td>Jan. 19</td>
<td>Spring Faculty Travel Grants, Spring Incentive Grants &amp; Research Development Awards, and Hurrell/McNaron Award for Scholarly Presentation</td>
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<tr>
<td>Jan. 19</td>
<td>Presidential, Geneseo Foundation, and Roemer Summer Faculty Fellowships</td>
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Student Programs

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<th>Date</th>
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<tbody>
<tr>
<td>Oct. 15</td>
<td>Dean Johnston Student Assistantships</td>
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<tr>
<td>Nov. 5</td>
<td>Student Research and Travel Grants</td>
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<tr>
<td>Dec. 1</td>
<td>Sorrell Chesin ’58 Research Award (selected departments)</td>
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<tr>
<td>Jan. 28</td>
<td>Student Research and Travel Grants</td>
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Dates to remember...

GREAT Day 2019 - Wednesday, April 17
Submissions open December 1, 2018

SUNY Undergraduate Research Conference (SURC) 2019 - Saturday, April 27
Niagara Community College
2017-18 Student Campus Awards
These awards are funded through the Geneseo Foundation from restricted gifts, unrestricted gifts and endowments.

Geneseo Foundation Full-Time Undergraduate Summer Fellowships ($3,000)
Molly Brady, *Motor Degeneration in Aging Mice: A Preliminary Study.* Faculty Sponsor: Terrance Bazzett, Neuroscience
Lindsey Dressler, *Analysis of p53-controlled genes in the good effort zebrafish mutant.* Faculty Sponsor: Yvonne Seale, History
Courtney King, *The ultrapotent corticosteroid, clobetasol, promotes quiescence in the vulvar carcinoma cell line, UMSCV-4,* also recipient of the Dr. Wendell and Barbara Rhodes Research Award ($600). Faculty Sponsor: Jani Lewis, Biology
Evan McCabe, *In Situ Expression Analysis of Stalk Eyed Fly Testes.* Faculty Sponsor: Josie Reinhardt, Biology
Isabel Owen, *My Heart is Not an Exit.* Faculty Sponsor: Lytton J. Smith, English
Johana Rocha, *Language Barriers between Children of Migrant workers and Adults in their Lives.* Faculty Sponsor: Jennifer Guzman, Anthropology

Geneseo Foundation Part-Time Undergraduate Summer Fellowships ($1,000)
Gregory Vinal, *Mosiac Knots.* Faculty Sponsor: Aaron Heap, Mathematics

Dean Johnston Student Research Assistantships ($1,000)
Brendan Cullen, *Pre-European Forests of North America.* Faculty Sponsor: Stephen Tuloweicki, Geography
Isabel Owen, *Anything I was big enough to do: Women and Gender in SNCC.* Faculty Sponsor: Emilye Crosby, History
Meagan Sullivan, *Multiplex mutagenesis using CRISPR Cas9.* Faculty Sponsor: Travis Bailey, Biology

Sorrell Chesin ’58 Undergraduate Research Award ($430, Biology and Chemistry Departments Students)
Christopher Keck, *Study of Mitochondrial Activity in Cells with Complex I Deficiency.* Faculty Sponsor: Wendy Pogozelski, Chemistry
Rachel Knapp, *The impact of Dcm on Escherichia coli stationary phase fitness.* Faculty Sponsor: Kevin Militello, Biology
Shawn Moore, *Effect of chain length on gelation ability of several biphenyl long-chain diesters.* Faculty Sponsor: Cristina Geiger, Chemistry
Kyle Powers, *Salt formation vs. co-crystallization: An exploration of the ΔpKa rule for a series of aromatic acids and bases.* Faculty Sponsor: David K Geiger, Chemistry
Nicolas Terrigino, *Discerning Molecular Mechanisms of Human Leukocyte Antigen Expression in Breast Cancer Cell Lines.* Faculty Sponsor: Robert W. O’Donnell, Biology
Jamie Wang, *Involvement of the transcription factor, Twist, in loss of E-cadherin in UMSCV-6 and A431 ce.* Faculty Sponsor: Jani E. Lewis, Biology

Faculty Travel Grants
118 Grants totaling $94,909 awarded in 21 departments

Faculty Incentive Grants
17 Grants totaling $20,920 awarded in 14 departments

Undergraduate Research and Travel Grants
238 grants totaling $113,571 awarded in 18 departments

Total Internal Support
$330,514
2017-18 Campus Faculty Awards

These awards are funded through the Geneseo Foundation from restricted gifts, unrestricted gifts and endowments.

Roemer Summer Faculty Fellowship ($5,000)
Jeffrey Peterson, Associate Professor, Chemistry, Elucidating the Impact of Nanoparticle Shape on Single Molecule Photophysics

Geneseo Foundation Summer Faculty Fellowship ($4,000 each)
Wendy Pogozelski, SUNY Distinguished Teaching Professor, Chemistry, Science of Type 2 Diabetes Book and Use of a Seahorse XF Analyzer to Measure Metabolic Changes in Cell
Barbara Welker, Associate Professor, Anthropology, Miocene Fossil Apes Book

Presidential Summer Fellowships ($3,500 each)
Enuju Kang, Assistant Professor, Political Science and International Relations, Whose Money Matters and How in Public Schools: Variations Across States
Karleen West, Assistant Professor, Political Science and International Relations, The Political Foundations of Community-Based Bioremediation in Sucumbios, Ecuador

Research Development Awards, ($3,750)
Karleen West, Political Science and International Relations, Are Ethnic Parties Different? A Study of Campaigns, Parties, and Elections in Ecuador

CIEE International Faculty Development Summer Seminar ($5,000)
Kodjo Adabra, Languages and Literatures, Best Practices For Creating Successful Faculty-Led Programs seminar, Paris, France

Proposal Writing Support Awards ($2,500 each)
Travis Bailey, Biology, Effects of Chromosome Assembly Factor 1b Mutations on Retinal Development
Jason Ozubko, Psychology, Using Virtualized, Real-World Environments to Examine the Development of Spatial Memory and Navigation in Novel Environments

Hurrell/McNaron Award ($1,000)
Alla Myzelev, Assistant Professor, Art History, Collaborative Art Practices Across Political Divides

2017-18 Faculty/Staff Grant and Fellowship Awards
34 Awards totaling $3,568,701

Myzelev, A. Art History, SUNY Innovative Instruction Technology Grant $16,800
McPherson, D. Biology, National Institute On Deafness And Other Communication Disorders $17,321
McPherson, D. Biology, National Science Foundation $13,537
O'Donnell, R. and Mittelatto, K. Biology, SUNY Performance Improvement Fund $220,000
Yang, S. Biology, Finger Lakes Project $750
Albers, J., Krumbholz, D. (SUNY Optometry), Uebelacker, M., and Kaur, J. Business, SUNY Optometry/USEF $2,300
Albers, J., Parimi, P. (SUNY Oswego), and Hossain, R. Business, SUNY Oswego, USEF $2,534
Helms, E., Bennett, J. (Oneonta), Albers, J., and Marasco, J. (Verdime) Chemistry and Business $40,000
Norman, S. Education, Greater Rochester Summer Learning Association $2,000
Norman, S. Education, Rochester City School District $76,800
Sikka, A. and Morse, J. Education, Rochester City School District/USEF $243,428
Urso, A. Education, Feinbloom Supporting Foundation/ Rochester Area Community Foundation $15,000
Urso, A. Education, United Way of Livingston County $5,000
Urso, A. Education, Wilson Foundation $25,000
Obard, J. English, Fulbright/CIES $13,613
Oberg, M. and Behrend, J. History, AAC&U/Endeavor Foundation $850
Lindsay, R. and Rawlins, B. Milne Library, NY State Education Department $750
Scott, D. Sociology, Fulbright/CIES $22,050

McClure, G., Burke, C., Anne, K., and Wilton, P. Music and CIT, I-Corps Teams/National Science Foundation $50,000
Kenney, T. Office of Diversity & Equity, Office on Violence Against Women/USDOJ $299,708
Routenberg, r. and Haggrian, M. Office of Diversity & Equity/Communication, SUNY Performance Improvement Fund $37,900
Easton, C. Office of the Dean of Academic Planning and Advising, SUNY Performance Improvement Fund $37,800
Cope, J. Office of the Provost/History, SUNY Performance Improvement Fund $45,000
Meisel, D., Freeman, C., and Iyer, S. Physics & Astronomy, Cornell University/NASA $20,000
Padalino, S., Freeman, C., Fletcher, K., Pogozelski, E., McLean, J., and Yuly, M. (Houghton) Physics & Astronomy, U of R Laboratory for Laser Energetics/USDOE $420,201
Steinhauer, A., Marcus, G., and Pellerin, A. Physics & Astronomy, Cornell University/NASA $10,000
West, K. Political Science & International Relations, Finger Lakes Project $750
West, K. and Yang, S. Political Science & International Relations/Biology, SUNY Innovative Instruction Technology Grant $9,833
Bazzett, T. Psychology, ICHP/CLRI, Buffalo State/NYS Office of Children and Family Services/DHHS $1,842
Bazzett, T. Psychology, ICHP/CLRI, Buffalo State/NYS Office of Children and Family Services/DHHS $1,368
Markowski, V. Psychology, National Institute on Drug Abuse/NIH $373,192
Ozubko, J. Psychology, National Institute of Neurological Disorders and Stroke/NIH $370,245
Parfitt, D. Teaching & Learning Center, SUNY Performance Improvement Fund $3,000