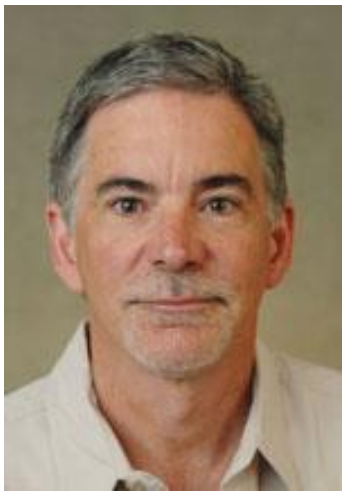
The Chemistry and Biochemistry Department is Making the News:



Professor receives sub-award from $11 million Tonawanda Coke Environmental Study

State University of New York at Fredonia Department of Chemistry and Biochemistry Professor Michael Milligan has received a sub-award of just over $87,000 to support his work in a State University at Buffalo investigation that will assess the health and environmental impacts of Tonawanda Coke manufacturing operations on residents of Tonawanda and Grand Island. Two separate, but complimentary studies, comprise the $11 million project.

Dr. Milligan will be engaged in the second study, "UB Soil Sample Study: Determining the Environmental Impact of Coke Oven Emissions Originating from Tonawanda Coke Corp. on Surrounding Residential Community."

Beginning in the spring, Milligan will be part of a team that will collect approximately 300 soil samples in residential areas in and around the Tonawanda Coke facility on River Road to assess pollutant levels in the soil. Initial analysis by a contract lab will provide certified results for a suite of classic pollutants, such as polyaromatic hydrocarbons.

More specific analysis will be performed using state-of-the-art instrumentation in Milligan's lab at Fredonia and the lab of UB Chemistry Professor Joseph Gardella, who is leading this study, to attempt to identify unique chemical markers for the different industrial processes that have been occurring in this general area for approximately 100 years.

Fredonia alumnus Milligan, '85, plans to hire a Fredonia undergraduate Chemistry major to assist in the sampling and laboratory efforts required for the soil study, which is to be completed by August 2018.

Results of the soil study will be used to assess the overall levels of contamination in affected residential areas, which could lead to environmental clean-up effort.

Additionally, researchers may potentially be able to connect environmental levels of contaminants to health effects of persons living in the impacted neighborhoods. For the full article see http://www.observertoday.com/news/business/2016/12/professor-receives-sub-award-from-11-million-tonawanda-coke-environmental-study/

Crystallography articles written by chemistry students get published in IUCrData

Nine students in the Department of Chemistry and Biochemistry at the State University of New York at Fredonia representing sophomore, junior and senior classes are making an impact in the scientific community one crystal structure at a time.

Their separate lab experiments produced two articles that were published in IUCrData, a peer-reviewed open-access data publication of the International Union of Crystallography. Both dealt with the molecular structure and crystal packing of a compound the students synthesized in their respective undergraduate laboratories.

Four seniors Joshua Deschner, Calvin Y. Wong, Ralph R. Crisci and Joseph Dragonette and three juniors Jack M. Choczynski, Kathleen L. Hayes and Emily Lasher had their paper published in the Feb. 21 issue. They are enrolled in CHEM 481 Advanced Experimental Laboratory. Their article can be read online.

The article by sophomores Trent R. Howard and Kaleh A. Mendez-deMello appeared in the Nov. 29, 2016 issue. They are enrolled in CHEM 225 Organic Chemistry Laboratory I. For the full article see: http://www.observertoday.com/news/local-region/2017/03/crystallography-articles-written-by-chemistry-students-get-published-in-iucrdata/

The Chemistry and Biochemistry Department was recently represented at the 254th American Chemical Society (ACS) National Fall Conference in Washington, D.C.

Brett Baker and Brianne Weichbrodt attended and presented their scientific findings at the 254th American Chemical Society (ACS) Fall National Meeting. ACS National meeting is one of the largest gathering of scientific minds from around the globe with at least 10,000 participants and attendees. The theme for the Fall 2017 meeting is Chemistry's Impact in the Global Economy. It was held at the nation's capital, Washington D.C on August 20-24.

Brett is senior majoring in chemistry. He presented a poster featuring is on-going study of Synthesis and Characterization of Anilinium Based Ionic Liquids. He aims to relate the structure of the molecule/ion pair to its physical properties such as melting point, viscosity and diffusion. The chemistry of ionic liquid is a fast growing field due to its wide array of application in industry, and energy generation/utilization. Brett also recently awarded the Keller Research award and the Boriello and Casden award as recognition for outstanding undergraduate research.

Brianne is also a senior chemistry major. Her study focuses on the Synthesis and Characterization of Sulfur-Boron Frustrated Lewis Pairs (FLPs). The science of FLPs are relative young and Brianne wants to add more example of FLPs. These FLPs are fascinating molecule that can capture and activate small molecules such as hydrogen gas (H_2), carbon dioxide (CO_2) and nitric oxide (NO). Applications of FLPs in catalysis, synthesis and even environmental protection is now being developed. Brianne has successfully synthesized a new example of these FLPs which impressed and captivated the attention of many attendees. Last summer, she joined the research group of Dr. John P. Richards at State University of New York at Buffalo (UB) as a summer research intern. She is also a recent recipient of the Frank J. Contanza's Greenhouse Memorial award which is a testament for her exemplary performance in undergraduate research.

Both students had very rewarding experiences. Their presentation skills was put to the test because they competed with the Solar Eclipse. The lively discussions resulted in useful connections and collaboration. The students and their mentor Dr. Allan Jay Cardenas would like to acknowledge Dr. and Mrs. Ralph Boriello, Office of Student Creative Activity and Research and the Department of Chemistry and Biochemistry.

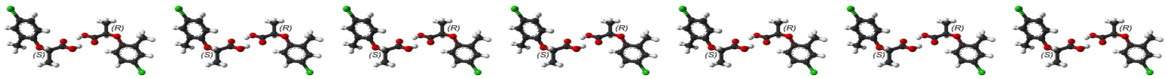
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

State University of New York at Fredonia
Fredonia, New York 14063
(716) 673-3281 **http://www.fredonia.edu/chemistry/**

Research projects in Chemistry and Biochemistry with $4 million of state of the art research equipment is excellent preparation for careers in academia, industry and healthcare.

Faculty – All faculty offer advisement for Chemistry/Biochemistry Programs; Specialty areas are listed for individual faculty.	***Specialty Areas and Research Interests***
Dr. Matthew Fountain Department Chair: 673-3287 or 673-3281 matthew.fountain@fredonia.edu	• Coordinator of the Biochemistry Program • Structure of nucleic acids and drug design • Drug candidates that targets telomeres • RNA structure that causes myotonic dystrophy
Dr. Matthew Gronquist: 673-4842 matthew.gronquist@fredonia.edu	• Organic and Applied Spectroscopy Instructor • Natural product identification in insects
Dr. Mark Janik: 673-3508 mark.janik@fredonia.edu	• Organic and Advanced Organic Chemistry Instructor • Organic and General Chemistry Laboratory Instructor • Research interests are in the area of synthetic organic/medicinal chemistry. • The compound colchicine is a known antimitotic agent. It exerts its anticancer effect by binding to the protein tubulin. This binding inhibits the polymerization of tubulin and hence stops the mitotic cycle.
Dr. Holly Lawson: 673-3815 holly.lawson@fredonia.edu	• Project Shepherd, Fredonia Science Center • Director, Science Education Partnership • Synthesis of ruthenium fullerene compounds and intercalation complexes • Teaching Scholarship: ▪ Pedagogies of engagement in the college classroom ▪ Enhancing student metacognition for deeper learning
Dr. Michael Milligan: 673-3500 michael.milligan@fredonia.edu	• Environmental Chemistry, Physical Chemistry and Instrumental Analysis Instructor • Impact of In- and Out-of-State Power Plants on Semivolatile Pollutants in New York State. • Deposition and Ambient Concentrations of Semivolatile Organic Pollutants in the Lake Ontario Region.
Dr. Allan Jay Cardenas: 673-4843 Allan.cardenas@fredonia.edu	• Inorganic, Molecular and Catalytic Chemistry • Synthesis and Characterization of Ionic Liquids • Synthesis and Characterization of New Class of Frustrated Lewis Pairs • Pendant Amine Assisted Conversion of Nitrogen Oxides

Chemistry and Biochemistry Scholarships and Awards



GENERAL CHEMISTRY (Awarded Fall)

- *To a full-time student who has completed the first year at Fredonia, for outstanding achievement in General Chemistry (lecture and lab; CH115-116 and CH125-126*

ORGANIC CHEMISTRY (Awarded Fall)

- *To the student completing the organic chemistry sequence (CH215-216, CH225-226) with strong performance as well as strong overall academic performance.*

DENNIS R. and KATHRYN L. COSTELLO SCHOLARSHIP (Awarded Fall)

- *For a full time undergraduate student majoring in either the Natural Sciences or Economics and demonstrating interest in climate change, global population control and/or environmental issues.*

DAVID DINGLEDY MEMORIAL FUND - PHYSICAL CHEMISTRY (Awarded Fall)

- *Presented annually to the student with the best overall performance in the physical chemistry sequence.*

DAVID DINGLEDY MEMORIAL FUND – SCHOLAR (Awarded Fall)

- *Best overall performance in the combined Fall and Spring semesters as determined primarily by calculation of the two semester combined GPA.*

GAVIN FAMILY SCHOLARSHIP (Awarded Fall)

- *Intended to encourage students to take an interest in research early on in their academic career.*

MARY J. MARLETTA SCHOLARSHIP (Awarded Fall)

- *To the most promising Biochemistry student applying to Fredonia.*

KELLY/KAMINSKI CHEMISTRY ACHIEVEMENT AWARD (Awarded Fall)

- *Given to a promising incoming freshman chemistry major based on his/her high school grades, an essay, and the Fredonia application.*

OUTSTANDING ALUMNI AWARD (Awarded Spring)

- *To an outstanding chemistry graduate of this department.*

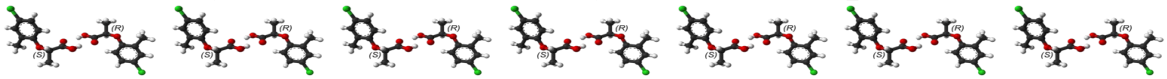
RAFFAELLE BORRIELLO M.D. and SUZANNE T. CASDEN CHEMISTRY DEPARTMENT **ENDOWMENT** (Awarded Fall or Spring)

- *To be used to support student travel to conferences*

FRANK J. COSTANZA'S GREENHOUSE MEMORIAL FUND (Awarded Spring)

- *This is awarded to an outstanding junior or senior chemistry or biochemistry major who is working while going to school full time.*

Chemistry and Biochemistry Scholarships and Awards



ROY KELLER ENDOWMENT (OUTSTANDING RESEARCH) (Awarded Spring)

- *To the student who has done outstanding research and has demonstrated dedication, as well as creative and independent thinking toward the research goal. Students are nominated by their research director and receive approximately $150.*

DR. PHILIP KUMLER CHEMISTRY AWARD (Awarded Spring)

- *Given to the student who presents the best chemistry seminar in a given year.*

DR. ROBERT MAYTUM SCHOLARSHIP (Awarded every 3 years in Spring)

- *To be awarded to a junior or senior science student who needs help to complete degree work.*

CAROLYN RUTH MOOS CHEMISTRY SCHOLARSHIP (Awarded Fall)

- *To a promising young chemistry or biochemistry entering freshman student.*

GILBERT and RUTH MOOS AWARD (OUTSTANDING SENIOR) (Awarded Spring)

- *Presented annually each spring to the full-time chemistry major who has completed four years of college with an overall GPA of at least 3.0/4.0 and evidence of distinctive*

OUR Future Award (**O**utstanding **U**ndergraduate **R**esearch) (Awarded Fall)

- *Awarded to a chemistry major, Biochemistry major, or dual major with chemistry that is actively involved in the undergraduate research program under the leadership or joint leadership of a chemistry faculty member.*

OUTSTANDING TEACHING ASSISTANT (Awarded Spring)

- *To the teaching assistant who is outstanding and receives supporting evaluations from students and staff.*

DR. JEROME H. SUPPLE MEMORIAL SCHOLARSHIP (Awarded Fall)

- *For a promising incoming chemistry major.*

BYRON A. THUMM AWARD (ANALYTICAL CHEMISTRY AWARD) (Awarded Spring)

- *To the full-time chemistry major attaining highest grades in Analytical Chemistry (CH317-318, CH327-328), and showing other evidence of interest and potential success in analytical chemistry (research, internship, etc.).*

DOROTHY VAN VALKENBURG AWARD (SERVICE AWARD) (Awarded Spring)

- *To the student who has been outstanding in service to the department.*

ADVISOR: _____ **Student:** _____

The Department of Chemistry and Biochemistry

State University of New York at Fredonia, Fredonia, NY 14063

Curriculum Checklist: B.S. Degree in BIOCHEMISTRY

(Curriculum Code: 0387)

GROUP I: COLLEGE CORE CURRICULUM - Please see separate sheet

GROUP II: CORE REQUIREMENTS FOR MAJOR IN BIOCHEMISTRY

COURSE NUMBER AND TITLE:		HRS	SEMESER COMPLETE F/S	YEAR	GRADE
CHEM 115	Gen Chem I Lecture	**3**			
CHEM 125	Gen Chem I Lab	**1**			
CHEM 116	Gen Chem II Lecture	**3**			
CHEM 126	Gen Chem II Lab	**1**			
CHEM 215	Org Chem I Lecture	**3**	**F**		
CHEM 225	Org Chem I Lab	**1**	**F**		
CHEM 216	Org Chem II Lecture	**3**	**S**		
CHEM 226	Org Chem II Lab ***or***		**F**		
CHEM 230	Advanced Org Lab	**1**	**S**		
BIOL 131	Intro Ecology and Evolution Lecture	**3**	**F**		
BIOL 132	Intro Ecology and Evolution Lab	**1**	**F**		
BIOL 133	Intro Cell & Molecular Biology Lecture	**3**	**S**		
BIOL 134	Intro Cell & Molecular Biology Lab	**1**	**S**		
BIOL 237	Genetics Lecture	**3**	**F**		
BIOL 238	Genetics Lab	**1**	**F**		
CHEM 317	Analytical Chemistry, Quantitative Analysis Lecture	**3**	**S**		
CHEM 327	Analytical Chemistry I Lab	**1**	**S**		
BIOL 380	Cell and Molecular Biology	**3**	**S**		
BIOL 397	Biochemistry Seminar I ***or***				
CHEM 495	Seminar: Advances in Chemistry	**1**	**F**		
BIOL 333	Biochemistry Lecture	**3**	**F**		
BIOL 334	Biochemistry Lab	**1**	**F**		
BIOL 465	Adv. Exp. Biochem Lab	**2**	**S**		
BIOL 475	Advanced Biochemistry	**3**	**S**		
CHEM 497	Biochemistry Seminar II ***or***				
CHEM 496	Chemistry Seminar II	**1**	**S**		
	Total	**46**			

GROUP III: Chemical Track (24 hours)

COURSE NUMBER and TITLE		HRS	SEMESTER COMPLETED		GRADE
			F/S	YEAR	
MATH 122	University Calculus I	4			
MATH 123	University Calculus II	4			
PHYS 230	University Physics I	4			
PHYS 232	University Physics I Lab	1			
PHYS 231	University Physics II Lecture	4			
PHYS 233	University Physics II Lab	1			
CHEM 315	Physical Chemistry I Lecture	3			
CHEM 325	Physical Chemistry Lab	1			
CHEM 316	Physical Chemistry II Lecture	3			
CHEM 326	Physical Chemistry II Lab	1			

or

GROUP III: Biology Track (23-26 hours)

COURSE NUMBER and TITLE		HRS	SEMESTER COMPLETED		GRADE
			F/S	YEAR	
BIOL 336	Mammalian Physiology Lecture	3	S		
BIOL 337	Mammalian Physiology Lab	1	S		
CHEM 315	Physical Chemistry I Lecture	3	F		
CHEM 318	Analytical Chemistry, Instrum Analysis	3			
MATH					
MATH 120	Survey of Calculus I Lecture	3			
MATH 121	Survey of Calculus II Lecture	3			
or					
MATH 122	University Calculus I Lecture	4			
MATH 123	University Calculus II Lecture	4			
PHYSICS					
PHYS 121	College Physics I Lecture	4			
PHYS 123	College Physics I Lab	1			
PHYS 122	College Physics II Lecture	4			
PHYS 124	College Physics II Lab	1			
Or					
PHYS 230	University Physics I Lecture	4			
PHYS 232	University Physics I Lab and	1			
PHYS 231	University Physics II Lecture	4			
PHYS 233	University Physics II Lab	1			

GROUP IV: Electives (6-9 hours)

Courses are outlined in the catalog.
Only 3 credits of research can go towards electives.

	Course Number and Title	HRS	F/S	YEAR	GRADE
BIOL/CHEM					
BIOL/CHEM					
BIOL/CHEM					
BIOL/CHEM					

Approved Chemistry Electives

- ✓ CHEM 316 & 326 Physical Chemistry II Lecture (3) & with lab (4) (BioTrack)
- ✓ CHEM 318 & 328 Analytical Chemistry II (3) & with lab (5) CHEM318(ChemTrack) CHEM 328 (BioTrack)
- ✓ CHEM 391/491 Independent Lab Research (3)
- ✓ CHEM 407 Organometallics (3)
- ✓ CHEM 412 Advanced Organic Chemistry (3)
- ✓ CHEM 417 Polymer: Chemistry 1 (3)
- ✓ CHEM 462 Inorganic Chemistry (3)
- ✓ CHEM 481 Special Topics in Chemistry (1-3) *
- ✓ CHEM 481 Medicinal Chemistry (3)

* Must be approved by the coordinator or Chair

Approved Biology Electives

- ✓ BIOL 336/337 Mammalian Physiology (3) with lab (4)
- ✓ BIOL 338 Microbiology (3)
- ✓ BIOL 419 Genes and Genomes (3)
- ✓ BIOL 435 Developmental Biology (3)
- ✓ BIOL 440 Undergraduate Research (3)
- ✓ BIOL 443 Plant Physiology (3)
- ✓ BIOL 437 Molecular Genetics Lab (2)
- ✓ BIOL 451 Microbial Genetics (3)
- ✓ BIOL 451 RNA Biology (3)
- ✓ BIOL 450 Molecular Basis of Disease (3)
- ✓ BIOL 461 Immunology and Serology (2)
- ✓ BIOL 438 Molecules and Medicine

Sample Four-Year Degree Plan

B.S. BIOCHEMISTRY - BIOLOGICAL TRACK

FREDONIA
STATE UNIVERSITY OF NEW YORK

The State University of New York at Fredonia is committed to doing our part to provide each student a clear path to graduation. This four-year degree plan is a sample map for fulfilling requirements in the major, the College Core Curriculum (CCC), and other supporting courses. The pathway that you take to your degree may differ somewhat from this illustration, depending on where you start and the detours and side trips you may take along the way. If you are committed to completing your degree in four years, we encourage you to consider signing up for the Fredonia in 4 program. For complete information about this degree program, please consult the university catalog at *fredonia.smartcatalogiq.com*

FIRST YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
BIOL 131	Introductory Ecology & Evolution	3	BIOL 133	Introductory Cell & Molecular Biology	3
BIOL 132	Introductory Ecology & Evolution Lab	1	BIOL 134	Introductory Cell & Molecular Biology Lab	1
CHEM 115	General Chemistry I	3	CHEM 116	General Chemistry II	3
CHEM 125	General Chemistry Lab I	3	CHEM 126	General Chemistry Lab II	1
MATH 120	Survey of Calculus I	4	MATH 121	Survey of Calculus II	3
ENGL 100	English Composition	3	CCC	American History	3
CHEM 100	Chemistry Freshman Seminar	1			
	TOTAL	**18**		TOTAL	**16**

SECOND YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
CHEM 215	Organic Chemistry I	3	CHEM 216	Organic Chemistry II	3
CHEM 225	Organic Chemistry Lab I	1	CHEM 230	Advanced Organic Lab	1
PHYS 121	College Physics I	3	CHEM 317	Analytical Chemistry, Quantitative Analysis	3
PHYS 123	College Physics Lab I	1	CHEM 327	Analytical Chemistry Lab I	1
BIOL 237	Genetics	3	PHYS 122	College Physics II	3
BIOL 238	Genetics Lab	1	PHYS 124	College Physics Lab II	1
CCC	Humanities	3	CCC	Social Science	3
	TOTAL	**15**		TOTAL	**15**

THIRD YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
BIOL 333	Biochemistry	3	CHEM 475	Advanced Biochemistry	3
BIOL 334	Biochemistry Lab	1	BIOL 380	Cell and Molecular Biology	3
CHEM 315	Introduction to Physical Chemistry	3	CHEM 465	Advanced Experimental Biochem. Lab	3
CCC	Western Civilization	3	CCC	Other World Civilizations	3
CCC	Foreign Language	3	CCC	Social Science	3
CCC	Art	3			
	TOTAL	**16**		TOTAL	**15**

FOURTH YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
CHEM 318	Analytical Chemistry, Instrumental Analysis	3		General Elective	3
	General Elective	3	CHEM 496	Seminar: Advances in Chemistry	1
	General Elective	3		General Elective	3
BIOL 336	Mammalian Physiology	3		BIOCHEM Major Elective	3
BIOL 337	Mammalian Physiology Lab	1		General Elective	3
	BIOCHEM Major Elective	3			
CHEM 495	Seminar: Advances in Chemistry	1			
	TOTAL	**17**		TOTAL	**13**
2016-2017				**GRAND TOTAL**	**125**

Students can take the University Calculus Sequence MATH 122-123 and University Physics Lecture and Lab sequence PHYS 230-233 instead of Survery of Calculus and College Physics.

Biochemistry
221 Science Center
The State University of New York at Fredonia
Fredonia, NY 14063

(716) 673-3287

email chemistry.department@fredonia.edu

web home.fredonia.edu/biochemistry

The B.S. Biochemistry - Biological Track degree is among the most comprehensive in the northeast. With its core emphasis on mastery of technical and analytical skills in biochemistry, our program is designed to prepare students for graduate school, medical school, or careers in biochemical research. It also provides a broad foundation in the liberal arts, enhancing our graduates' abilities to meet challenges in a shifting social climate.

fredonia.edu

NATURAL SCIENCES

FREDONIA
STATE UNIVERSITY OF NEW YORK

Why Study the Natural Sciences at Fredonia?

The Natural Sciences at Fredonia encompass state of the art programs in pure and applied sciences that prepare you well for graduate school and professional careers. Each program gives you the opportunity to engage in meaningful research in collaboration with the faculty.

Choose from a variety of disciplines

- Mathematical Sciences offer programs in pure and applied mathematics, as well as certification programs in mathematics education.
- Computer and Information Sciences have multiple programs including those in software development, systems management and cooperative computer engineering.
- Biology houses programs in Biology, Medical Technology, Molecular Genetics, Exercise Science and Biology Adolescence Education.
- The Department of Chemistry and Biochemistry offers programs approved by the premier accreditor, The American Chemical Society, as well as certification program in Adolescence Chemistry Education.

- Programs in the Physics Department include several concentrations in Physics (including Physics Education), as well as being the home for most Cooperative Engineering majors.
- Programs in Geology and Environmental Sciences cover all aspects of earth and planetary sciences as well as the interdisciplinary programs in environmental science and GIS.

Thrive in state-of-the-art Science Center

- Our new $60 million Science Center features $5 million in cutting-edge instruments and equipment. It boasts an innovative design that maximizes student learning, facilitates student-faculty collaboration, and creates spontaneous interactions across disciplines.
- Research labs and classrooms incorporate glass walls, natural light and open spaces, allowing visitors to easily observe students and faculty learning together.

Receive an exceptional value

- Fredonia alumni in graduate and medical schools consistently say they were better prepared than their peers at larger schools because of rigorous Fredonia courses, smaller class sizes, undergraduate research opportunities and genuine relationships with faculty mentors.
- Internships are conducted in hospital labs, physician offices, health departments, environmental agencies, and energy, biomedical and pharmaceutical companies, as well as hospitals, pharmacies, veterinary clinics and zoos.
- Health Professions Advising Program assists students pursuing careers in medicine, dentistry, optometry and veterinary medicine.
- Students perform field research in Lake Erie, its tributaries and Fredonia's 200-acre nature sanctuary.

- Numerous need- and merit-based scholarships and fellowships are available for academically talented students, including some of the biggest awards available on campus.

Exceptional faculty

- Faculty conduct research and are recognized consistently for their efforts on local, regional, national and international levels.
- Their interests range from studying the animal behavior of bats and praying mantises, among other species, quantifying the potential natural gas held with the Marcellus Shale region, and improving the water quality of the Great Lakes.

- One professor's research spurred a national law signed by President Obama. It bans the use of plastic microbeads in beauty and exfoliating products — because a Fredonian showed they contaminate water systems.

Alumni successes

- Many recent graduates are enrolled in medical, dental, veterinary and optometry schools.
- Alumni have gone on to become clinical scientists, high school teachers, biomedical research scientists, physicians, pharmacists, environmental scientists, venture capitalists, veterinarians, lab directors, lawyers and forensic scientists, among other professions.
- Fredonians are among the faculty at University of California at Berkley, Penn State University, Indiana University of Pennsylvania, The Scripps Research Institute and other institutions.

Sample Four-Year Degree Plan

B.S. BIOCHEMISTRY - CHEMICAL TRACK

FREDONIA
STATE UNIVERSITY OF NEW YORK

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CHEM 115	General Chemistry I	3	CHEM 116	General Chemistry II	3
CHEM 125	General Chemistry Lab I	1	CHEM 126	General Chemistry Lab II	1
MATH 122	University Calculus I	4	MATH 123	University Calculus II	4
ENGL 100	English Composition	3	PHYS 230	University Physics I	3
CHEM 100	Chemistry Freshman Seminar	1	PHYS 232	University Physics Lab I	1
	TOTAL	**16**		TOTAL	**16**

SECOND YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
CHEM 215	Organic Chemistry I	3	CHEM 216	Organic Chemistry II	3
CHEM 225	Organic Chemistry Lab I	1	CHEM 230	Advanced Organic Lab	1
PHYS 231	University Physics II	3	CHEM 317	Analytical Chemistry, Quantitative Analysis	3
PHYS 233	University Physics Lab II	1	CHEM 327	Analytical Chemistry Lab I	1
BIOL 237	Genetics	3	CCC	American History	3
BIOL 238	Genetics Lab	1	CCC	Social Science	3
CCC	Humanities	3			
	TOTAL	**15**		TOTAL	**14**

THIRD YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
BIOL 333	Biochemistry	3	CHEM 475	Advanced Biochemistry	3
BIOL 334	Biochemistry Lab	1	CHEM 136	Advanced Physical Chemistry	3
CHEM 315	Introduction to Physical Chemistry	3	CHEM 326	Advanced Physical Chemistry Lab	1
CHEM 325	Introduction to Physical Chemistry Lab	1	CHEM 465	Advanced Experimental Biochem. Lab	2
CCC	Western Civilization	3	CCC	Other World Civilizations	3
CCC	Foreign Language	3	CCC	Social Science	3
CCC	Art	3			
	TOTAL	**17**		TOTAL	**15**

FOURTH YEAR

Fall Semester			Spring Semester		
Course		**Credits**	**Course**		**Credits**
	BIOCHEM Major Elective	3	BIOL 380	Cell and Molecular Biology	3
	General Elective	3	CHEM 496	Seminar: Advances in Chemistry	1
	General Elective	3		General Elective	3
	BIOCHEM Major Elective	3		BIOCHEM Major Elective	3
	BIOCHEM Major Elective	3		General Elective	3
CHEM 495	Seminar: Advances in Chemistry	1			
	TOTAL	**16**		TOTAL	**13**
2016-2017				**GRAND TOTAL**	**122**

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- The Department of Chemistry and Biochemistry offers programs approved by the premier accreditor, The American Chemical Society, as well as certification program in Adolescence Chemistry Education.

- Programs in the Physics Department include several concentrations in Physics (including Physics Education), as well as being the home for most Cooperative Engineering majors.
- Programs in Geology and Environmental Sciences cover all aspects of earth and planetary sciences as well as the interdisciplinary programs in environmental science and GIS.

Thrive in state-of-the-art Science Center

- Our new $60 million Science Center features $5 million in cutting-edge instruments and equipment. It boasts an innovative design that maximizes student learning, facilitates student-faculty collaboration, and creates spontaneous interactions across disciplines.
- Research labs and classrooms incorporate glass walls, natural light and open spaces, allowing visitors to easily observe students and faculty learning together.

Receive an exceptional value

- Fredonia alumni in graduate and medical schools consistently say they were better prepared than their peers at larger schools because of rigorous Fredonia courses, smaller class sizes, undergraduate research opportunities and genuine relationships with faculty mentors.
- Internships are conducted in hospital labs, physician offices, health departments, environmental agencies, and energy, biomedical and pharmaceutical companies, as well as hospitals, pharmacies, veterinary clinics and zoos.
- Health Professions Advising Program assists students pursuing careers in medicine, dentistry, optometry and veterinary medicine.
- Students perform field research in Lake Erie, its tributaries and Fredonia's 200-acre nature sanctuary.

- Numerous need- and merit-based scholarships and fellowships are available for academically talented students, including some of the biggest awards available on campus.

Exceptional faculty

- Faculty conduct research and are recognized consistently for their efforts on local, regional, national and international levels.
- Their interests range from studying the animal behavior of bats and praying mantises, among other species, quantifying the potential natural gas held with the Marcellus Shale region, and improving the water quality of the Great Lakes.

- One professor's research spurred a national law signed by President Obama. It bans the use of plastic microbeads in beauty and exfoliating products — because a Fredonian showed they contaminate water systems.

Alumni successes

- Many recent graduates are enrolled in medical, dental, veterinary and optometry schools.
- Alumni have gone on to become clinical scientists, high school teachers, biomedical research scientists, physicians, pharmacists, environmental scientists, venture capitalists, veterinarians, lab directors, lawyers and forensic scientists, among other professions.
- Fredonians are among the faculty at University of California at Berkley, Penn State University, Indiana University of Pennsylvania, The Scripps Research Institute and other institutions.