

# **Biology Student Handbook**

**2023 - 2024**



**Department of Biology  
School of Science**

The College of New Jersey



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## INTRODUCTION

This handbook is designed to help you gain the most from your experience at The College of New Jersey (TCNJ). It will acquaint you with procedures, policies, opportunities and services that exist at TCNJ and within the Biology Department. The Biology Handbook supplements, but does not replace *The College of New Jersey Undergraduate Bulletin* and the [Biology Web Page](#).

### **The Curriculum in Biology**

(please also refer to the [Undergraduate Bulletin](#), [Plan Summary Sheets](#), and the [Biology Web Page](#).)

A new **Bachelor of Arts (BA) major** was introduced in the Spring of 2019, to complement the existing Bachelor of Science (BS) major. The BA has fewer required science course correlates and Biology options, and is designed to allow students more flexibility in course selection. (See [full description](#) on website for details.)

### **Biology Degree Core and Correlate Course Requirements:**

Course	BS	BA	Course	BS	BA
BIO 099 (non-credit)	Yes	Yes	CHE 201 – Gen Chem I	Yes	Yes
BIO 201 - Foundations	Yes	Yes	CHE 202 – Gen Chem II	Yes	Yes
BIO 211 – Cell Bio and Biochem	Yes	Yes	CHE 331 – Organic Chem I	Yes	No
BIO 221 - Ecology	Yes	Yes	CHE 332 – Organic Chem II	Yes	No
BIO 231 - Genetics	Yes	Yes	MAT 127 – Calculus A	Yes	Yes
BIO 495, 496, or 498	Yes	Yes	MAT 128 or STA 215	Yes	No
Organism/Evolution Option	Yes	Yes	PHY 201 – Physics I	Yes	No
Additional Biology Options	4	3	<i>Note: many grad programs require Physics II</i>		

**Also note:** Biology Secondary Education majors must complete a second quantitative course (MAT 128, MAT 200, or STA 215).

### **Biology Options**

In addition to the 200-level Biology Core Courses, each biology student must complete a prescribed number of units of Biology **option courses** (300 and 400 level courses), at least one of which must meet the “organism and evolution” requirement, which is fulfilled by a course that meets the following criteria:

- Primary focus is at organism level, centering on what it means to be an organism;
- The course emphasizes macro-evolutionary processes;
- The course emphasizes an organismal perspective, rather than a cellular, molecular, or biochemical one.

Each semester's option courses can be found on the biology webpage and in the Biology Registration Newsletter. The number of option courses required for each program of study within Biology is detailed in the section “Biology Policies” (App VI, pg 16). Finally, one biology option can be met by pursuing Independent Research in Biology, (see next page), a Biology Internship (BIO 390), or a Biology Research Internship (BIO 399). Students may not receive both transfer Independent Research credit and BIO 399 credit for the same research experience.

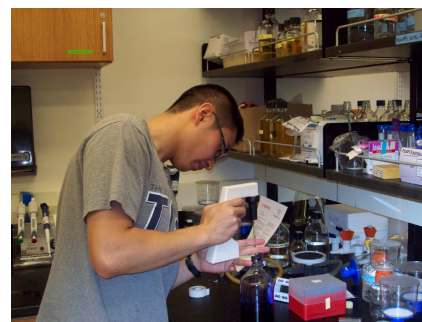
### **The College Core**

Biology majors must complete the [College Core](#) Requirements as well as the Biology major requirements. Complete information can be found at the link above, but in general, Bio majors must take:

1. First-Year Seminar (FYS) course
2. FYW 102 (if required) plus a mid-level writing intensive course (BIO 221/Ecology and Field Biology) and a senior-level year writing intensive course in the major (BIO 495, BIO 496 or BIO 498)
3. Second language, intermediate competency, met by starting a new language and completing through the third introductory second language course (103), or by continuing with a language through the 103 level based on placement testing
4. Information literacy requirement, which is met by showing proficiency through an on-line process
5. Social justice requirements, which may be met by completing an approved course, program, or equivalent sustained experience
6. Multidisciplinary Perspective requirements, which are met by one of several options described on the College Core home page.

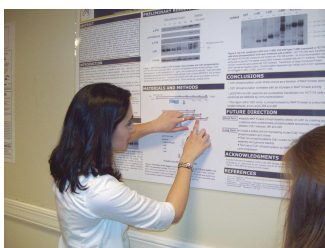
## **Research**

Independent research is highly recommended as a way to acquire a foundation in biology by engaging in original research under the direction of a faculty member. Opportunities include on-campus research with a faculty mentor (Independent Research), and off-campus research opportunities for academic internship credit (BIO 399/Biology Research Internship). A fall workshop hosted by the Bio Department provides information on how to become involved.



### ***Independent Research in Biology***

- a. **Advisement:** After reviewing the list of the research interests of the faculty, students should discuss sponsorship with the appropriate faculty member at least one semester prior to when they plan to register for independent research. Acceptance of the student by a faculty member (mentor) will be based on the availability of the mentor's time, resources and facilities.
- b. **Application and Proposal:** An [Independent Research Enrollment Form](#) should be completed by the student, signed by the faculty mentor, department chair and Dean before being submitted to Records and Registration. The student can register for one course unit of independent research or internship as a biology option credit.



- c. **Course Options:** Research course options include the following:
  - o **BIO 393** Independent Research in Biology I
  - o **BIO 493** Independent Research in Biology II
  - o **BIO 494** Honors Independent Research in Biology II
  - o **BIO 495** Independent Research in Biology Capstone
  - o **BIO 496** Honors Independent Research in Biology Capstone(See Appendices, pgs 14-16, for more information on Indep. Research)

### ***Biology Internship (BIO 390)***

The Internship in Biology (BIO 390) course provides the opportunity for students to earn Biology option credit for an off-campus, biology-focused internship. Both paid and unpaid internships can qualify. Also, the internship, entailing a significant time commitment over multiple weeks, does not have to occur during the semester. *Internships must first be approved by the Coordinator, Dr. Pecor ([pecor@tcnj.edu](mailto:pecor@tcnj.edu)).*

### ***Biology Research Internship (BIO 399)***

A number of local pharmaceutical and biotech companies, as well as universities and ecological field stations throughout the country, offer undergraduate summer research opportunities that qualify for academic internship credit. In most cases students must apply to and be accepted into these programs. An extensive [list](#) of opportunities is linked to the Biology home page. Students interested in obtaining academic credit for internship experiences should contact Internship Coordinator [Dr. Erickson](#) (x2673) *before engaging in the research* to discuss whether the experience will qualify for credit. The criteria for engaging in research can be found online in the Course Descriptions in the Undergraduate Bulletin.

### ***Departmental Honors***

Departmental Honors in Biology provides advanced research experience and recognition of outstanding achievement. To be eligible to graduate with Departmental Honors in Biology, the biology major must conduct a minimum of three semesters of research at TCNJ (BIO 393, 493, 494, 495, or 496), write a thesis, and defend the thesis orally in front of a committee. To apply to graduate with Departmental Honors in Biology, the student must first meet with the Departmental Honors Advisor, and then form a committee consisting of the student's research advisor and two additional Biology faculty members. To graduate with Departmental Honors in Biology, the student must complete the research, present it publicly, defend the thesis, have a minimum overall GPA of 3.3, a minimum science GPA of 3.5, and have completed at least 5 biology course units at TCNJ. Additional information may be obtained from [Dr. Clement](#) (x 2672), Biology Departmental Honors Advisor.

## **Academic Opportunities and Services**

### ***Areas of Interdisciplinary Interest for Biology Majors:***

Mathematics and Computer Science: Minors in *Statistics* or *Computer Science* offer the Biology major an opportunity to delve into the areas of mathematical modeling and bioinformatics.

Business: A minor in one of the departments in the School of Business can prepare students for careers in scientific administration, sales, personnel, marketing or management.

Art: An art minor can be of value if the student has an interest in scientific illustration and advertising. Graphics and advertising art techniques combined with the biology major would be of value in pharmaceutical supply house sales, basic research publications, and grant development.

Public Health, and the Environment: The Department of Sociology and Anthropology offers a Public Health major and minor, as well as a Sociology major with a concentration in Health and Environmental Studies. The Liberal Learning program also offers interdisciplinary concentrations in Health Communication, and Environmental Studies. These areas may supplement the career options for Biology majors.

Journalism: The School of Arts and Communication offers [minors](#) in Journalism and Professional Writing which can provide training for Biology majors interested in science writing as a career option.

### ***Marine Science Consortium***

The College of New Jersey is a member of the New Jersey Marine Sciences Consortium. The Consortium offers courses at Sandy Hook in Monmouth County. This affiliation provides our students with an excellent opportunity to take a course in Marine Biology during the summer months for biology option credit. There are also courses in marine science and scuba diving, which can be taken as free electives. These can expand a liberal learning education and lead to a life-long avocation. For further information, contact [Dr. Gary Dickinson](#), ext. 2456.

### ***Study Abroad***

Biology majors can greatly enrich their education by studying abroad for a full academic year, a semester, or a summer. The biology curriculum is flexible enough that graduation requirements can be met even if a student studies abroad; however, it is wise to plan ahead and discuss this with your advisor as early in your college career as possible. Visit the Center for Global Engagement's [website](#) for more information.

### ***Earn Credit Serving as a Course Assistant***

Serving as a Course Assistant provides advanced students with experience mentoring students in introductory and options courses. Course Assistants earn either 0.25 or 0.5 course units of elective credit, depending on the course with which they are affiliated. An "Info Session" with details, and the specific courses needing assistants, is usually held prior to Registration Period.

### ***Tutoring***

#### ***a. Obtaining the Services of a Tutor***

Science classes present a variety of academic challenges, whether you are adjusting to college or balancing a rigorous courseload. Sometimes, the difficulty can be resolved by consulting the instructor, but other times the problem may need regular, on-going assistance provided by the Tutoring Center.

Through a variety of programs, the Center's administrators and peer tutors help students appraise areas of difficulty and develop appropriate learning strategies to master needed content and skills.

These programs include:

- Supplemental instruction in selected courses
- Study Groups facilitated by tutors
- Single-session Writing Conferences at any stage of an assignment
- [Online Writing Lab](#) (OWL) for internet writing resources and email assistance with specific writing questions
- Tutoring, by-appointment, for course content
- Drop-in tutoring for some math or science courses

The Tutoring Center is located in Roscoe West Hall, Suite 101 and is open Monday-Friday during the daytime and on selected evenings as posted early in the semester. Information about services and schedules is available on the [Tutoring Center](#) web site.

### ***b. Becoming a Tutor***

If you enjoy sharing your knowledge of biology or any other area of study with others, consider becoming a tutor for the Tutoring Center. Working as a tutor carries several benefits. For further information, contact the [Tutoring Center](#), Roscoe West Hall Suite 101, ext. 3325.

## **Advisement for Future Schooling, Career Selection and Assistance**

### ***Faculty Advisement***

PAWS provides the name and extension of your assigned academic advisor in Biology who will remain your advisor throughout your college experience at The College of New Jersey. Your advisor will help you to plan your academic future and career based on your aims and goals. He or she will help plan course selections, solve many of your academic problems, guide you through procedures, make helpful referrals, and attempt to personalize your academic endeavors.

### ***Preparation to Teach Biology: Traditional Undergraduate Track (Biology 2° Ed Major)***

The Biology Secondary Education major follows a program with a science/math component very similar to that of the Liberal Arts major. The professional education courses will require that you plan your four-year schedule carefully to avoid conflicts with science courses. Student Teaching is a full-time commitment occurring during the fall or spring semester of your senior year, at which time you should not take other courses in liberal studies, math or science. Permission to student-teach as a biology major must be obtained from the Biology Department's Secondary Education Student Teacher Coordinator, [Dr. Luke Butler](#) after meeting the requirements outlined in the undergraduate bulletin.

### ***Graduate School Advisement***

All faculty in the department can provide information and guidance to students interested in attending graduate school at both the Masters and Ph.D. levels. [Dr. Tracy Kress](#) additionally serves as advisor for the department's Graduate Studies Club (see pg 8). Students interested in graduate work should consult their advisor and join the club for advice on topics such as taking standardized tests (e.g., GREs), fulfilling requirements, and the like. However, since the application process for graduate studies varies from field to field, students should consult not only their advisor, but also any and all faculty in their specific area of interest (ecology, developmental biology, molecular biology, etc.). In addition, each fall the department hosts a session called "How to Get Involved in Research" and in the spring faculty host an informational session on graduate school. *It is critical that students interested in pursuing graduate work become involved in research while at TCNJ.*

### ***Medical Careers Advisory Committee: Pre-Medical and Allied Health Preparation***

The Medical Careers Advisory Committee (MCAC) provides information, guidance, assistance and recommendations to qualified students interested in health professional schools. Students are encouraged to visit (and READ!) the [Medical Careers](#) website, to speak with committee members, and to attend information sessions held each semester for guidance in preparing for medical careers.

The Medical Careers Advisory Committee is comprised of [Dr. Sudhir Nayak](#), serving as Chair, and Drs. Erickson, Kress, and O'Connell in Biology, and Dr. Chan in Chemistry, Dr. Wagner in Engineering, and Dr. Leynes in Psychology. Staff assistance is provided by [Ms. Helen Kull](#), Biology Department Program Assistant and MCAC Administrative Staff. The MCAC can also be contacted through its email, [mcac@tcnj.edu](mailto:mcac@tcnj.edu). All materials for applicant files should also be sent to this email address.

Entry into a health professional school is dependent on a number of factors, including *admissions test scores* (DAT, MCAT, etc.), overall undergraduate *GPA*, extensive *clinical volunteer and service experience*, and strong *letters of recommendation*. In preparation for active application to Medical, Dental, Optometry, and other health professional programs as a Junior or Senior, the student should consult the MCAC website for current information and advice, and set up an appointment with the MCAC Chair. The student should also check individual professional school materials to learn the entrance requirements and specifics of the professional programs.

### ***Seven Year BS/OD (Optometry) Program***

This accelerated program works in conjunction with The New York State College of Optometry (SUNY) in Manhattan and is available to entering first-year students and to enrolled biology first-year students and first-semester sophomores. Freshman biology students may apply to the BS/OD program provided they have a minimum 3.3 overall GPA, and at least a 3.3 GPA in the math and science prerequisites for the major. Admission is decided on an individual basis by officials at both TCNJ and SUNY. BS/OD majors must maintain an overall GPA of 3.3 or higher in all required science and math courses, with no grade in the required courses below a C. Students are required to take the Optometry Admissions Test (OAT) and achieve a 320 or better on all sections. More specific information on the program is available from the [Optometry Program](#) web page; or the Optometry Program Director [Dr. Sudhir Nayak](#).

### ***Seven Year BS/MD Medical Program***

This accelerated program with Rutgers New Jersey Med School is only available to entering first-year students. Complete program admission and retention information is available on the [webpage](#), or from the Director [Dr. Sudhir Nayak](#).



### ***Scholarships and Fellowships***

Students can obtain financial support for their undergraduate, graduate, or professional school studies through scholarships and fellowships. Some awards also provide opportunities for research, or clinical experience. See the departmental [scholarship and fellowship](#) web page.

### ***Career Advisement***

[The Office of Career Services](#) provides a variety of programs and resources to assist students planning for graduate and professional school, such as:

1. Assistance in identifying career options
2. Resume writing and interviewing skill development
3. Small group workshops on topics including "Interview Skills", "Effective Resume and Cover Letter Writing", "Job Search Strategies" and "Internship Opportunities" during the year
4. Graduate School advisement and related testing information (e.g. GRE, GMAT, LSAT, MCAT)
5. Meetings with counselors to discuss your plans

In addition, the Biology [Opportunities](#) page has links to some job listings.

### ***Counseling and Prevention Services (CAPS)***

The [Counseling and Prevention Services \(CAPS\) Office](#) is located in Eickhoff Hall, Room 107. The CAPS staff provide a variety of counseling options, including individual and group counseling, with the opportunity to address personal and emotional problems that may impact your academic work. All services are free and confidential.

### ***Accessibility and Accommodations***

The campus Accessibility Resource Center (ARC) works with students, faculty and staff to accommodate a variety of individual needs. To request and secure accommodations, visit the [ARC](#) webpage.

## **Departmental Organizations**

### ***Biological Honor Society, Beta Beta Beta (Tri-Beta)***

Advisors: [Dr. Gary Dickinson](#) (x2456) and [Dr. Nina Peel](#) (x3128)



tribeta\_tcnj

“Tri Beta” is the casual name of the national biology honor society, and our chapter functions both as an honor society and a service organization for students in the biological sciences. Its main objectives are to promote scholarship in the biological sciences and dissemination of biological knowledge, to facilitate faculty/student interaction, and encourage research. Activities hosted by Tri-Beta are open to all majors, and include trips, and parties. Tri-Beta also hosts the Peer Mentoring program, organizes service events, and provides students who serve as “BioGuides” for prospective students at Open Houses, Accepted Students Days, and other such events.

### ***American Society for Biochemistry and Molecular Biology (ASBMB)***

Advisors: [Dr. Zaara Sarwar](#) (Biology) and [Dr. Danielle Guarracino](#) (Chemistry)



asbmbtcnj

This group gathers students with interests in biochemistry to discuss current research, career opportunities, and areas for further exploration.

### ***American Medical Students Association (AMSA)***

Advisor: [Dr. Sudhir Nayak](#) (x2659)



tcnjamsa

AMSA provides information to pre-medical students about preparation for and the nature of medical training, including a national database and a set of contacts for pre-medical students. Our local chapter sponsors premedical advisement workshops, admissions seminars, financial aid presentations, visits to local medical schools, and the annual Hippocrates Luncheon with TCNJ alumni who are practicing physicians.

### ***AZ/BS-MD Club***

Advisor: [Dr. Sudhir Nayak](#), (x2659)

AZ (formerly “Alpha Zeta,” but not a Greek organization) is a student organization consisting of the participants in the BS/MD Articulation Program with Rutgers-New Jersey Medical School. It is designed to help with the transition to medical school, and provides support, information and networking opportunities for its members.

### ***Additional Organizations***

Information and advisement for students interested in dentistry, optometry, and other health fields are offered by the Medical Careers Advisory Committee faculty, and these **other student groups**:

- **Pre-Dental Club** – information and networking for students looking to pursue dentistry as a career  
Advisor: [Dr. Carolina Borges](#) (Public Health, x2008); contact [dental@tcnj.edu](mailto:dental@tcnj.edu)
- **Pre-Vet Club** – information and education about veterinary schools and study  
Advisor: [Dr. Keith Pecor](#), x2460; contact [prevet@gmail.com](mailto:prevet@gmail.com)
- **MAPS** - Minority Association of Pre-health Students - supporting career goals for students in underrepresented groups. Advisor: [Dr. Sudhir Nayak](#), x 2659



And follow the Biology Department on Instagram at **tcnjbiology**

## **Appendix I**

### **Roster of Faculty, 2023 – 2024**

**Luke K. Butler**      [lbutler@tcnj.edu](mailto:lbutler@tcnj.edu)      Office, BIO 240, x2531      Lab, BIO 250, x2898

*Associate Professor; earned Ph.D. at University of Washington*

Teaching responsibilities: Foundations of Biological Inquiry, Avian Biology, Animal Behavior, Birding  
Like a Biologist

Research interests and Academic Services:

1. Causes and consequences of variation in the molt dynamics of birds
2. Adaptations and life-history trade-offs in the structure of body feathers
3. Physiological and behavioral responses to stress in vertebrates
4. Advisor for Biology Secondary Education program students

**Wendy Clement**      [clementw@tcnj.edu](mailto:clementw@tcnj.edu)      Office, BIO 203, x2672      Lab, BIO 236, x3074

*Department Chair and Professor; earned Ph.D. at University of Minnesota, Twin Cities*

Teaching responsibilities: Foundations of Biological Inquiry, Ecology and Evolution of Plant-Insect  
Interactions, Systematic Biology, and Biology Seminar

Research interests and Academic Services:

1. Plant systematics and evolution
2. Pollination biology
3. Biogeography

**Gary H. Dickinson**      [dickinga@tcnj.edu](mailto:dickinga@tcnj.edu)      Office, BIO 143F, x2456      Lab, BIO 253, x2023

*Professor; earned Ph.D. at Duke University*

Teaching responsibilities: Foundations of Biological Inquiry, Animal Physiology, Biological Materials

Research interests and Academic Services:

1. Physiological ecology of marine invertebrates
2. Adhesion, biomineralization, and larval behavior of barnacles
3. Biological responses to ocean acidification and climate change
4. Marine biofouling and its prevention
5. Co-advisor for *Tri-Beta*

**Curt Elderkin**      [elderkin@tcnj.edu](mailto:elderkin@tcnj.edu)      Office, BIO 241, x2819      Lab, BIO 249, x2874

*Professor; earned Ph.D. at University of Louisiana, Lafayette*

Teaching responsibilities: Foundations of Biological Inquiry, Ecology and Field Biology, and Evolution

Research Interests and Academic Services:

1. Population genetics and biogeography of freshwater invertebrates
2. Ecology and conservation of freshwater mussels
3. Evolutionary ecology of freshwater invertebrates
4. Invasive species ecology

***On Sabbatical Fall 2023-Spring 2024***

**Kathryn Elliott**[elliottk@tcnj.edu](mailto:elliottk@tcnj.edu)

Office, BIO 128, x2671

Lab, BIO 222, x3335

*Associate Professor; earned Ph.D. at University of Michigan*Teaching responsibilities: Genetics, Bacterial Pathogenesis, Bacterial Genetics, and Biology SeminarResearch interests and Academic Services:

1. Genetics and biochemistry of genetic recombination
2. Nature and frequency of gene duplication and amplification
3. Evolution and adaptation of gene amplification mutants

**Jeffery T. Erickson**[erickson@tcnj.edu](mailto:erickson@tcnj.edu)

Office, BIO 238, x2673

Lab, BIO 251, x3380

*Associate Professor; earned Ph.D. at University of North Carolina at Chapel Hill*Teaching responsibilities: Cell Bio and Biochemistry, Neurobiology, Biology Research InternshipResearch Interests and Academic Services:

1. Developmental respiratory neurobiology
2. Growth factors and sensory neuron development
3. Genetic determinants of vertebrate breathing behavior
4. Neuroscience Club advisor

**Tracy Kress**[kress@tcnj.edu](mailto:kress@tcnj.edu)

Office, BIO 229, x2462

Lab, BIO 222, x3335

*Professor; earned Ph.D. at Brown University*Teaching responsibilities: Foundations of Biological Inquiry, Cell Bio and Biochem, Molecular Biology of Gene Expression, and Biology SeminarResearch Interests and Academic Services:

1. Regulation of gene expression in the yeast *Saccharomyces cerevisiae*
2. Mechanisms and regulation of RNA processing
3. Coordination of RNA splicing with chromatin remodeling and transcription
4. Co-Director, Faculty-Student Scholarly and Creative Collaborative Activity
5. GradS (Graduate Studies Club) advisor

**Donald Lovett**[lovett@tcnj.edu](mailto:lovett@tcnj.edu)

Office, BIO 129, x2876

Lab, BIO 134, x2675

*Professor; earned Ph.D. at University of Louisiana, Lafayette*Teaching responsibilities: Foundations of Biological Inquiry, Microscopic Anatomy and Techniques, Biology Seminar, and Freshman Seminar.Research Interests and Academic Services:

1. Anatomy and ultrastructure of the crustacean gill
2. Mechanisms of osmoregulatory response in the blue crab
3. Gene expression in crabs
4. Supporting at-risk students in the sciences

**Dave Marzan**[marzand@tcnj.edu](mailto:marzand@tcnj.edu)

Office, P-120, x2040

*Clinical Lecturer; earned Ph.D. at New York University School of Medicine*Teaching responsibilities: Principles of Human Anatomy and Physiology I and II (*nursing students only*)Research interests and Academic Services:

1. Neuroscience and neuroimmunology
2. Inclusive pedagogy
3. Academic Diversity Officer for Underrepresented Student Success

**Janet Morrison**[morrisja@tcnj.edu](mailto:morrisja@tcnj.edu)

Office, BIO 227, x3091

Lab, BIO 220, x3362

*Professor; earned Ph.D. at S.U.N.Y. at Stony Brook*Teaching responsibilities: Freshman Seminar, Ecology and Field Biology, Biology of Seed Plants, and Plants and PeopleResearch Interests and Academic Services:

1. Ecology and evolution of plant-pathogen interactions in natural communities
2. Ecological mechanisms and community effects of non-native plant invasions & overabundant deer
3. Ecology, conservation, and biodiversity of urban/suburban forests
4. Botanical evolutionary ecology
5. Experimental approaches in field ecology
6. Factors affecting participation in mentored undergraduate research experiences

**Sudhir Nayak**[nayak@tcnj.edu](mailto:nayak@tcnj.edu)

Office, BIO 126, x2659

Lab, BIO 243, x3436

*Professor; earned Ph.D. at University of Pennsylvania*Teaching responsibilities: Freshman Seminar, Genetics, Genomics and Bioinformatics, Foundations of Computational Biology, and Biology SeminarResearch Interests and Academic Services:

1. Genetics analysis of cell fate specification and execution in the nematode (*Caenorhabditis elegans*)
2. Post-translational control of proteins involved in nematode oogenesis
3. Software development for sequence analysis
4. Director of both the Seven-year BS/MD and BS/OD programs
5. Chair of the Medical Careers Advisory Committee
6. Advisor for AMSA and AZ/BS-MD clubs

**Marcia O'Connell**[moconnel@tcnj.edu](mailto:moconnel@tcnj.edu)

Office, BIO 228, x2879

Lab, BIO 248, x2879

*Professor; earned Ph.D. at S.U.N.Y. at Stony Brook*Teaching responsibilities: Foundations of Biological Inquiry, Cell Bio and Biochemistry, Genetics, Developmental Biology, and Biology SeminarResearch Interests and Academic Services:

1. Determination and formation of the embryonic axes in vertebrates
2. Regulation of tissue specific genes in zebra fish embryos
3. Maternal regulation of polyadenylation

**Keith Pecor**[pecor@tcnj.edu](mailto:pecor@tcnj.edu)

Office, BIO 130, x2460

Lab, BIO 111, x3020

*Professor; earned Ph.D. at University of Michigan*Teaching responsibilities: Environmental Biology, Foundations of Biological Inquiry, Ecology and Field Biology, Biology of the Invertebrates, and Biology Seminar.Research Interests and Academic Services:

1. Ecology and natural history of freshwater invertebrates
2. Behavioral effects of sleep health
3. Academic Integrity Officer for the School of Science

**Nina Peel**[peeln@tcnj.edu](mailto:peeln@tcnj.edu)

Office, BIO 131, x3128

Lab, BIO 243, x3436

*Associate Professor; earned Ph.D. at University of Cambridge, UK*Teaching responsibilities: Cell Bio and Biochem, Genetics, Genetics of Cancer, and Biology SeminarResearch Interests and Academic Services:

1. The function of microtubule glutamylation in *C. elegans*
2. How hyperglutamylation disrupts germline function
3. How centrosome function is modulated by glutamylation
4. Co-advisor for Tri-Beta

**Howard Reinert**[hreinert@tcnj.edu](mailto:hreinert@tcnj.edu)

Office, BIO 226, x2474

Lab, BIO 114, x2154

*Professor; earned Ph.D. at Lehigh University**Teaching responsibilities:* Ecology and Field Biology, Biostatistics, Physiological & Behavior Ecology, Herpetology, and Pine Barrens Ecology*Research Interests and Academic Services:*

1. Ecology, behavior and physiology of reptiles and amphibians
2. Habitat selection in snakes
3. Predator/prey relationships and the foraging behavior of vertebrates
4. Conservation and management of endangered animal species
5. Application of molecular biological techniques to ecology and conservation biology

**Zaara Sarwar**[sarwarz@tcnj.edu](mailto:sarwarz@tcnj.edu)

Office, BIO 116, x2457

Lab, BIO 219, x2179

*Assistant Professor; earned Ph.D. at Syracuse University**Teaching responsibilities:* Microbiology, Principles of Microbiology, Bacterial Signal Transduction*Research Interests and Academic Services:*

1. Signal transduction and gene regulation in bacteria
2. Bacterial pathogenesis
3. Advisor for ASBMB

**Mitchell Sitnick**[sitnicm1@tcnj.edu](mailto:sitnicm1@tcnj.edu)

Office, BIO 117, x2246

*Visiting Assistant Professor; earned Ph.D. at University of California, Davis**Teaching responsibilities:* Human Form and Function, Human Anatomy and Physiology*Research interests:*

1. Integrative physiology, and the molecular regulation of skeletal muscle mass

**Leeann Thornton**[thornton@tcnj.edu](mailto:thornton@tcnj.edu)

Office, BIO 119, x2875

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*Professor; earned Ph.D. at Washington University in St. Louis**Teaching responsibilities:* Foundations of Biological Inquiry, Biology of Seed Plants, Plant Genetics, and Freshman Seminar*Research Interests and Academic Services:*

1. Plant stress responses
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3. Molecular genetics of multi-gene protein families

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1. The interplay between individual plasticity and evolutionary processes
2. The evolution of animal behavior
3. The evolution of adaptive radiations

**On Sabbatical Fall 2023**

## Appendix II

### Professional Education Unit Statement of Policy

for Undergraduate Exit Requirements in Teacher Education Programs

As a result of New Jersey State Department of Education code revisions (Section 6.11-5.1), a cumulative grade point average (GPA) of at least 3.0 (or  $\geq 2.75$  with a Praxis 2 exam score  $>10\%$  above minimum passing score and an appeal to the State) is required for students to successfully complete their teacher education program and be recommended for certification and licensure.

To help assure that students at The College of New Jersey meet this graduation requirement:

- Admission to **candidacy** in all teacher education programs will require a 2.75 minimum GPA following completion of 60 credits, and
- Admission to **student teaching** in all teacher education programs will require a 2.75 minimum GPA.

Exceptions involving admissions will be considered on an individual basis, and granted upon approval of the Chair of the Department offering the program and the Dean of Education.

*~ Adopted on Feb 16, 2000, by the Teacher Education Advisory Council, and amended in 2014.*

## Appendix III

### Concerning Transfer Credit

#### **On-line/Distance Learning Courses:**

Ordinarily, transfer credit will **NOT** be given for any laboratory course which is taught on-line, even if *njtransfer.org* may indicate that a course with that number qualifies for transfer credit.

#### **Courses not listed on *njtransfer.org*:**

For a course to count as a biology option, it must, at a minimum, require the biology major introductory course as its prerequisite, and be eligible for biology major credit at the home institution. In addition, for the course to be approved for credit at TCNJ, students must provide documentation of the formal course description, the course's prerequisites, the number of meetings, whether the course has a lab, and the nature of the lab. Documentation may be provided to the Biology Department Chair as print-outs of the institution's information, or electronically in pdf form, or as the URL where the information can be found.

#### **Approvals:**

Students should gain approval for transfer credit prior to taking the course, unless it appears on *njtransfer.org*.

## ***Appendix IV***

### **Guidelines for 300-level Biology Independent Research**

#### **Course requirements**

- 1) Workload commensurate with credit hours: for a 0.5 course unit (2 semester hours) course, a student is expected to engage in an average of 7.5 hours of research activity per week; and for a 1.0 course unit course, 15 hours of work per week is expected
- 2) Maintenance of a laboratory notebook
- 3) Attendance at laboratory meetings
- 4) Attendance at Departmental Seminars and Poster Sessions

Students who complete a half course unit of Bio 393 are expected to turn in their lab notebook for final evaluation. Students who complete 1 or more course units in Bio 393 must submit an appropriate culminating project. The details of this culminating project are at the discretion of the research mentor. Examples might include a literature review, production of a final figure appropriate for presentation or publication, or a poster presentation. A student that fails to meet the basic requirements and/or does not produce a research paper or poster will not pass. If the project involves more than one student working together, then each student is responsible for understanding the project completely.

#### **A. Excellent Performance**

- engages in persistent, hard work
- exhibits ability to work independently and demonstrates technical independence
- shows strong interest in theoretical aspects of research
- maintains an excellent lab notebook with up-to-date recording, tabulating, and analysis of data
- gives competent presentations in lab meetings
- final culminating project is of excellent to outstanding quality

#### **B. Good Performance**

- engages in persistent, hard work
- exhibits technical competence and follows instruction well
- demonstrates reliability and produces reproducible experimental work
- maintains a clear, organized lab notebook with evidence that the experiments are understood
- shows interest in lab meetings and participates in the research conversation
- final culminating project is of good to very good quality

#### **C. Average performance**

- engages in persistent, hard work
- performance in experimental work is fair to poor
- demonstrates an ability to work with limited supervision
- lab notebook displays evidence of confusion and is inadequately maintained
- participation in lab and lab meetings is of low quality
- final culminating project is of fair quality

#### **D. Poor Performance**

- performance is inadequate or sloppy
- displays inability to work without direct supervision
- has an inadequate grasp of the technical aspects of the work
- does not maintain an organized research notebook
- final culminating project is unclear and poorly organized or presented

## ***Appendix V***

### **Guidelines for 400-level Biology Independent Research**

#### **Basic Requirements:**

- 1) Workload commensurate with credit hours: for a 0.5 course unit (2 semester hours) course, a student is expected to engage in an average of 7.5 hours of research activity per week; and for a 1.0 course unit course, 15 hours of work per week is expected
- 2) Attendance at laboratory meetings
- 3) Maintenance of a laboratory notebook
- 4) Attendance at all departmental seminars and poster sessions
- 5) Presentation of a research poster to the department
- 6) Submission of a final research paper written in a style suitable for a scientific journal and the final version archived with the department for review

#### **Performance Rubric**

Students will be given a grade of IP until the project is completed. For the final grade, a plus or a minus may be given based upon the level of accomplishment within a grade level. A student that fails to meet the basic requirements and/or does not produce a research paper or poster will not pass.

##### **A Excellent Performance**

- Engages in persistent, hard work
- Displays independent intellectual and technical involvement in work
- Has an excellent grasp of technical and theoretical aspects of research
- Makes project his or her own; makes creative contribution to design and analysis of experiments
- Maintains an excellent lab notebook with up-to-date recording, tabulating, and analysis of data
- Displays critical thinking in lab meetings
- Final poster presentation and written research paper are of excellent to outstanding quality

##### **B Good performance**

- Engages in persistent, hard work
- Exhibits ability to work independently and demonstrates technical independence
- Delivers a very solid performance and completely reliable and reproducible experimental work
- Gives competent presentations in lab meetings
- Maintains a clear, organized lab notebook
- Final poster presentation and written research paper are of good to very good quality

##### **C Average performance**

- Engages in persistent, hard work
- Performance in experimental work is fair to poor
- Demonstrates an ability to work with limited supervision
- Lab notebook is inadequately maintained
- Participation in lab and lab meetings is of low quality
- Final poster presentation and written research paper are of fair quality

##### **D Poor performance**

- Performance is inadequate or sloppy
- Displays inability to work without direct supervision
- Has an inadequate grasp of the technical aspects of the work
- Does not maintain an organized research notebook
- Poster and paper are unclear and poorly organized and presented

## ***Appendix VI***

### **Learning Goals for Independent Research in the Department of Biology**

#### **Learning Goals**

1. Work with increasing independence in a research lab environment.
2. Work collaboratively in a research lab environment.
3. Accurately and precisely execute hands-on, biological research to investigate scientific questions
4. Contextualize how research relates to broader scientific questions.
5. Effectively communicate research goals and findings.

#### **Learning Goals and Learning Objectives**

For each Learning Goal above, a list of possible *Learning Objectives* has been provided. This is not an exhaustive list. Many independent research experiences will likely supplement this list with *Learning Objectives* specific to that particular experience; other *Objectives* may not be appropriate for all research labs or levels of engagement in research (400 level research experiences are marked with an asterisk).

#### **1. Work with increasing independence in a research lab environment.**

- Manage time to meet research goals in a given week
- Troubleshoot to make progress on research goals
- Learn when to seek out additional expert advice\*
- Understanding why procedures are constructed in specific ways and when modifications are necessary\*

#### **2. Work collaboratively in a research lab environment**

- Share ideas in lab meeting
- Help other students with procedures
- Maintain/monitor shared resources
- Discuss ideas from the literature review
- Mentor labmates in technical and intellectual development\*
- Collaborate with mentor on dissemination of the research\*

#### **3. Accurately and precisely execute hands-on, biological research to investigate scientific questions.**

- Maintain an accurate, detailed laboratory notebook (physical or electronic)
- Responsibly maintain laboratory resources
- Demonstrate facility in required research techniques
- Contribute to experimental design, data analysis, and the evaluation of hypotheses\*
- Precisely execute data collection, data maintenance, and data analysis methods\*
- Revise and troubleshoot experiments\*

#### **4. Contextualize how research relates to broader scientific questions.**

- Find and evaluate relevant primary research articles
- Explain theoretical aspects of research techniques and questions
- Identify unanswered questions based upon a literature review and/or new questions/hypotheses based upon project results\*

#### **5. Effectively communicate research goals and findings.**

- Present findings from the literature during lab meetings
- Orally present original research findings in Lab meetings and/or Poster presentations\*
- Write about scientific research
  - ☛ Research update reports
  - ☛ Literature review\*
  - ☛ Annotated bibliography
  - ☛ Scientific research paper\*
  - ☛ Write an abstract for presentation or paper

## ***Appendix VII***

### ***Biology Department Academic Policies***

#### **Biology Core-related Prerequisites:**

- A student must have earned at least a C- in BIO 201 Foundations of Biological Inquiry in order to enroll in any BIO course numbered 200 or above. A passing grade in CHE 201 is also required for BIO 211.
- Completion of (or exemption from) MAT 120, FYS and FYW is a prerequisite for enrollment in BIO 221 Ecology and Field Biology.
- A passing grade in BIO 211 Cell Biology and Biochemistry is a prerequisite for enrollment in BIO 231 Genetics.
- A passing grade in at least three 200-level core courses (i.e., BIO 201, BIO 211, BIO 221, and BIO 231) is a prerequisite for enrollment in any 400-level biology course. Depending on the course, a student may be co-enrolled in the fourth 200-level course while taking a 400-level course.
- BIO 498 Biological Seminar is a full course unit (4 semester hours) and is a writing-intensive (W) course designed to meet the TCNJ Liberal Learning requirements. Students are required to pass all 200-level core courses (i.e., BIO 211, BIO 221, and BIO 231) before they can enroll in BIO 498. The core courses cannot be taken as co-requisites in the same semester as BIO 498. Students planning on studying abroad during their final year at TCNJ should take note of this requirement.
- BIO 390/Biology Internship and BIO 399/Biology Research Internship may be taken for credit only once for any particular research experience. Students may not receive both transfer research credit and BIO 399 credit for the same research experience.

#### **Independent Research Pre-requisites:**

- BIO 393 Independent Research in Biology I
  - Prerequisites: C- or better in BIO 201; an overall GPA of 2.5 or higher
- BIO 495 Independent Research in Biology Capstone
  - Prerequisites: an overall GPA of 2.5 or higher; completion of at least one course unit of BIO 493/494 under the same instructor; may substitute for BIO 498 Biological Seminar as the capstone course and an in-major writing intensive (W) course; it may not be used to count as a biology option course.
- BIO 496 Honors Independent Research in Biology Capstone
  - Prerequisites: an overall GPA of 2.5 or higher; completion of at least one course unit of BIO 493/494 under the same instructor; may substitute for BIO 498 Biological Seminar as the capstone course and an in-major writing intensive (W) course; it may not be used to count as a biology option course.

#### **Biology Options Courses:**

- Biology Secondary Education majors no longer are required to complete PHY 202, but they must now complete an additional biology option course (for a total of 4 option courses, including one organisms and evolution).
- For all biology majors, no more than half of the required biology option courses (including the organisms and evolution biology option course) may be transfer credits. All additional transfer credits can be applied as general electives toward the overall graduation requirement.
  - For Biology Liberal Arts majors: Five option courses are required, of which one must be in organisms and evolution biology, no more than 2 option courses may be transfer credits

from another institution, but one of the two can be the organisms and evolution biology option course.

- o For Biology BA majors and Biology Secondary Education majors: Four biology option courses, of which one must be in organisms and evolution biology, and no more than two may be transfer credits from another institution.
  - o For 7-Year Medical Biology majors: Two 300- or 400-level biology option courses, one of which must have a lab, and no more than one may be transfer credit from another institution.
  - o For 7-Year Optometry majors: All required biology option courses must be taken at TCNJ.
  - o For students pursuing a Biology minor: Two biology option courses, of which no more than one may be transfer credit from another institution.
- Only one course unit (in aggregate) of research courses (BIO 390, 393, 399, 493, 494, 495, or 496) can count as a biology option course. All additional credits in these courses can be applied as general electives toward the overall graduation requirement, *with the exception of BIO 495 or 496, which is an alternative of BIO 498 for the capstone course.*

#### Graduation and Retention Requirements

- The graduation requirement of a minimum GPA of 1.67 in the core includes only the following courses in this calculation: BIO 201, BIO 211, BIO 221, and BIO 231. In addition, other students who elect to use BIO 495 or 496 as the capstone may not include the grade in this course in the calculation.
- Retention in the program is based on the following performance standards:
  - o For all biology majors: at the end of the fourth semester at the college, students must have a minimum cumulative GPA of 2.0 in all math and science courses (excluding any biology courses numbered below 185), and must have completed at least three science courses required by the major.
  - o For Biology Secondary Education majors: students must earn at least a cumulative grade point average (CGPA) of 2.75 or higher before enrolling in the junior year education sequence. To be allowed to student teach (BIO 490), the student must establish a minimum CGPA of 2.75 or higher, and must have completed the biology core in order to be allowed to student teach (BIO 490). Candidates for a teacher-education certificate must have a CGPA of 2.75 or higher to successfully complete their teacher education program.
  - o For 7-Year Medical Biology majors: the student must maintain an overall and semester GPA of 3.5 or higher; earn an A- or better in the introductory courses BIO 201 and CHE 201; and a B or better in all other courses.
  - o For 7-Year Optometry majors: students must maintain an overall GPA of 3.3 or higher and a GPA of 3.3 or higher in all required science and mathematics courses, with no grade in the required courses below a C.
  - o For Biology minors: the student must have a minimum cumulative GPA of 2.0 in all math and science courses (excluding any biology courses numbered below 185), and must have completed at least three science courses required by the major at TCNJ.
- Graduation with any major in biology or a biology minor requires an overall GPA of 2.0 in courses for the program, and a cumulative GPA of 2.0 in all math and science courses taken at TCNJ, and a 1.67 in the core (BIO 201, BIO 211, BIO 221, and BIO 231).

## ***Appendix VIII***

### ***Campus Building Abbreviations***

ARMS	Armstrong
AIMM	Art and Interactive Multi Media Bldg
ATHL	Athletic Recreation Center
BUSI	Business Building
BIOL	Biology Building
BLIS	Bliss Hall
BROW	Brower Student Center
FORC	Forcina Hall
KEND	Kendall Hall
MUSI	Music Building
PACK	Packer Hall
SOCI	Social Sciences Building
SCIE	Science Complex
SCIE-P	Science Complex – Physics & Math
SCIE-C	Science Complex - Chemistry
STEM	STEM Building
TRAV	Travers Hall
TREN	Trenton Hall
WLIB	Roscoe West Library
WOLF	Wolfe Hall



### **Science Complex Buildings: Room Nomenclature**

Room prefixes “Bio” such as Bio-209 are in the Biology Building

Room prefixes “P” (for Physics) such as P-101 are in the Physics/Math Wing

Room prefixes “C” (for Chemistry) such as C-117 are in the Chemistry Wing