

# University of North Carolina at Chapel Hill

## Certificate Program Application Form

*Please use this application form as a guide for your Certificate Program proposal.*

**Name of Proposed Certificate Program:** Graduate Certificate in Science Education

**Sponsoring Academic Unit:** Biology Department

**Administering Unit, if different:** Office of Graduate Education

**Primary Contact Name:** Rebekah Layton

**Address and CB #:** 1124 Bioinformatics Bldg, 130 Mason Farm Road, CB 7108, Chapel Hill, NC 27599

**Phone Number:** 919-843-8439      **Email:** rlayton@unc.edu

**First Term the Certificate Would be Offered:** Fall 2017

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### **1. Describe the Certificate Program and provide a statement of educational objectives.**

The Graduate Certificate in Science Education is intended to be a 2-3 year program (approximately 3-5 fall/spring semesters) for life-science PhD candidates preparing for teaching-intensive careers. Applicants may enter the program at any time as long as they have 2-3 years expected remaining until degree completion (recommended to start the program in the 3<sup>rd</sup> year of training). The program provides students with teaching experience under the guidance of a master teacher, as well as coursework in pedagogy and assessment, with a capstone immersive teaching internship at a local institution tailored to the trainee.

Training will include learning best practices in science education, including formal pedagogical training and associated applications; development of teaching materials and course modules; a mentored team teaching experience; a teaching practical internship; and submission of a project. Students will have two project options to choose from regarding projects: one which focuses on reflective teaching practices and one which focuses on teaching-as-research (TAR). The certificate program is intended for PhD students in the biological and biomedical sciences who wish to pursue teaching-intensive or teaching-related careers. These skills are specifically targeted toward traditional classroom teaching, yet the benefits of learning how to teach and communicate may also improve trainees' ability to mentor others in the lab.

Participation in the program will allow students to accomplish the following program objectives:

- Gain an understanding of scientific evidence-based teaching practices and educational theory
- Learn and practice reflective teaching and conduct personal projects using teaching as research principles

***Completed and approved applications should be submitted to:***

Stephanie Schmitt, Associate Dean for Academics, [sschmitt@email.unc.edu](mailto:sschmitt@email.unc.edu)

*Updated: July 20, 2010*

- Participate in a mentored team teaching experience and an individual teaching internship tailored to each student's teaching and career interests
- Produce a reflective teaching document (teaching portfolio) or complete a teaching as research project (poster, paper, or presentation)
- Combine their experience as a scientific researcher with experience as an educator to bring the best of both into the classroom, lab, and/or mentorship environment

**2. Include a statement about the need for such a Certificate Program, and specifically why there is a need to offer this Certificate at UNC-Chapel Hill. Is the Certificate offered at other universities or community colleges?**

*Purpose (Overall Program):* The proposed Certificate provides a **unique combination of pedagogical training and teaching experience** formally recognized through the graduate school

*Need.* The training provided by the proposed certificate would prepare future faculty members and/or those interested in teaching-intensive careers in the sciences (e.g., science outreach, teaching positions) to transition into their professional roles successfully. This would fulfill a need for training and provide a credential that could make a crucial difference to hiring committees during UNC doctoral trainees' future job searches. None of the currently existing options entails completion of required coursework, production of documented teaching outcomes (e.g., teaching portfolio or TAR project), nor results in a graduate certificate providing recognition of their expertise.

UNC has a strong tradition of building cutting-edge professional development opportunities for graduate students, with institutionalized programs like Training Initiatives in Biological and Biomedical Sciences (TIBBS) since 2006, membership in the National Institutes of Health-Broadening Experiences in Scientific Training (NIH-BEST) Consortium since 2014, professional development programming in the Graduate School, and most recently UNC's membership in the Center for the Integration of Research Teaching and Learning (CIRTL) Network since 2016. As a national leader in professional development, the addition of this Certificate option for UNC trainees will **continue to keep UNC at the forefront of professional development programming, particularly in the area of science education.**

*UNC Offerings.* UNC does not currently offer a program through the University allowing PhDs candidates to earn a formal Certificate with a focus on STEM teaching. While a comprehensive certificate program is offered to medical students through the Certificate in Medical Education, this is not open to PhD scientists in training, leaving a gap in training opportunities for this population. Programs such as Training Initiatives in Biological and Biomedical Sciences (TIBBS) Summer Series or the Future Faculty Fellowship Program (FFFP) graduate-school wide are much less intensive and do not result in a Certificate. These a la carte training options in science education for graduate students (e.g., TIBBS Summer Series) or in teaching more broadly (e.g., Center for Faculty Excellence's FFFP), there is currently no overarching program to help trainees gain the skills, experience, and training needed to be competitive on the job market for teaching-intensive or teaching-related careers in science.

*National Offerings.* It is becoming increasingly common for research institutions nationwide to offer graduate teaching certification programs on campus. An example of a peer institution with similar an analogous program in the biomedical sciences is Vanderbilt University's Certificate in College Teaching (<https://cft.vanderbilt.edu/programs/certificate-in-college-teaching/>). Another

example is that of Boston University's Vesalius Certificate in Teaching of Anatomy and Neurobiology (open to all biomedical students with similar course requirements to the ones proposed herein, <http://www.bu.edu/academics/gms/programs/vesalius-certificate/> as well as Certificates in Chemistry Education and Biology Education. Other examples include the Graduate Teaching Program at UC-Boulder Certificate in College Teaching (<http://www.colorado.edu/graduateschool/teaching-and-professional-development>) and the UC Berkeley Certificate of Teaching and Learning in Higher Education (<http://gsi.berkeley.edu/programs-services/certificate-program/certificate-requirements/>). Each of these provides different approaches to how requirements and program structures may vary, illustrating the diversity of options available nationally.

*Purpose (Program Design Chronology):* Gradually increasing teaching responsibilities in conjunction with pedagogical training will provide **scaffolding for developing teaching knowledge and skills** (e.g., coursework/module design and teaching, mentored team teaching, internship capstone)

The combination of coursework with opportunities to design and teach will develop gradually over the course of the Certificate. Design and presentation of a single module in the initial course will be followed by a mentored course-design team-taught undergraduate course in the second and third courses; the individualized internship component will complete the evolution to greater levels of responsibility as a capstone experience. There is precedent for this type of programmatic evolution as UNC, yet it has never been combined into one program/certificate (scaffolding experiences plus individual internship). Previously, four students successfully completed an early version of the certificate program, the Burroughs Wellcome Funded Science Educator Certificate (2012-2013), which served as a less-intensive pilot program without any formal University designation. This re-envisioned program incorporates expanded coursework along with the teaching internship program. Furthermore, this retooled certificate program could serve as a pilot for more broadly applicable teaching certificates in other disciplines, or cross-disciplinary, as part of the UNC CIRTl initiative to develop new programming to prepare future faculty.

*Purpose (Experiential Component):* An **individualized, significant teaching experience** provides a capstone to the Certificate training (constituted by sufficient *magnitude* and *mentorship*)

Teaching internships may be coordinated independently or through existing programs on campus. Internship programs and teaching experiences not yet approved may also be considered as fulfilling the experiential mentored teaching experience by request if they meet similar *magnitude* and *mentorship* criteria. These will be evaluated on a case-by-case basis by the Leadership Team (Director, Co-Director) for approval, including the criteria of *magnitude* of the intern's teaching experience, role, and responsibilities and formal *guided teaching mentorship* between teaching intern/supervisor. The individualized, significant teaching experience will typically occur in the final semester of their certificate training.

Certificate applicants may choose to customize the experience through a variety of internship programs or teaching experiences coordinated individually or via other campus offerings with prior approval. Examples include: Immersion Program to Advance Career Training (ImPACT) Internships; Graduate School Bland summer fellowships; departmental or individually arranged internships; other approved mentored teaching experiences. The UNC ImPACT program provides fully-funded 160-hour internships in the field of the trainees' choice, including

teaching. Teaching interns who apply through the Certificate to complete teaching internships through the ImPACT program would receive priority preference). Accordingly, funding sources for internships may evolve over time (e.g., could be combined with Teaching Assistantships or adjunct teaching opportunities).

*Purpose (Teaching Document):* Completing a reflective teaching statement or teaching-as-research project will **provide the opportunity to consolidate knowledge and experience** gained through the Certificate program.

The final requirement, completion of a reflective teaching statement or a teaching-as-research project will provide Certificate candidates with a formal document that demonstrates their expertise as a reflective teacher and/or scholar of teaching and learning.

The Certificate teaching document can serve a second purpose (optional) for those who wish to be involved in CIRTl levels of recognition (e.g., Practitioner, Associate, or Scholar; see guidelines at <https://www.cirtl.net/p/about-us-learning-outcomes>). The CIRTl program “uses graduate education as the leverage point to develop a national STEM faculty committed to implementing and advancing effective teaching practices for diverse student audiences,” making this a fitting partnership of added value for those who choose to fulfill this additional option.

**3. Describe the demographics of the target student population for the Certificate Program. Double click each box that applies and describe the intended audience.**

- ☐ Undergraduate Students
- ☒ Graduate Students
- ☐ Professional Students: \_\_\_\_\_
- ☒ Degree-seeking, Matriculated Students
- ☐ Non-Degree-Seeking Students

As mentioned above, the target audience will be PhD students in the sciences only.

**4. Why is the Certificate Program necessary beyond offering the program as a minor, supporting area, or specialization/concentration/track?**

Doctoral science training programs on campus are focused on providing rigorous scientific training and do not have minors associated with non-scientific specialties. Trainees in scientific disciplines often have limited or no opportunity to gain experience as a teaching assistants; yet, many are interested in gaining scientific teaching experience and pedagogical training to develop this skillset; the Certificate in Science Education would provide a credential to acknowledge this additional expertise gained by junior scientists to enhance their preparedness as professionals for the future (e.g., faculty, teaching-intensive, and administrative/program director roles).

**5. Provide specific courses and other requirements for the Certificate Program. Separate listings of courses may be included with the proposal.**

*Recommended Prerequisite Workshops (10 hours - optional):*

*Purpose:* Applicants who choose to complete workshops will be most competitive for the Certificate program, as it will prepare them to with an appropriate level of initial knowledge to determine and demonstrate their **interest and commitment to pursue a teaching-intensive**

**career.** Demonstration of interest and commitment can be accomplished through a multitude of pathways, some examples of which are included below.

*Selected Workshops, Seminars, Webinars/Courses:* Ten hours of education-related workshops, seminars, or series are highly recommended and if completed, documentation should be provided with certificate application materials (e.g., formal letter from department or organization administering program; certificate of attendance; workshop or course registration/completion document).

*Examples of Elective Workshops & Teaching Conference:* The education-related workshops seminars, and series may include pedagogical training and/or professional development for teaching intensive careers such as TIBBS teaching events; Future Science Educators (FuSE) events; CFE workshops for graduate students including FFFP programming, and/or CIRTl courses or seminars (in-person or online)—this list is not exhaustive but simply provides examples.

For instance, one way to complete this would be to participate in the FFFP program (~10-12 hours total). Another option could be to complete all or part of the TIBBS Summer Teaching Series (~10-12 hours total) which includes a series of workshops presented by teaching experts from within and outside of UNC (past topics have included: interactive team learning, learning assessment, Process Oriented Guided Inquiry Learning (POGIL), development of teaching portfolio/statement/job application materials, managing the classroom, syllabus design, challenges of first time teaching, and active learning). A combination of Graduate Student Professional Development workshops on teaching would also complete this portion.

Another way to fulfill this could also include participation in teaching conferences. In general, it is highly encouraged to attend at local, regional, or national teaching or education conferences (e.g., American Society of Microbiology Conference for Undergraduate Educators; National Science Teacher's Association/North Carolina Science Teacher's Association; Association for Science Teacher Education-International/Regional; Elon University's Annual Teaching and Learning Conference – local and free to attend).

Other non-credit bearing courses can also contribute to gaining this experience (e.g., PITAP 810 Preparing International Teaching Assistants Program-PITAP: Communicating in the American Classroom). Relevant workshops or coursework in the School of Education may also count toward workshop experience.

*Coursework (9 c.u. total):*

*Purpose:* Formal coursework, including a mentored-teaching course with a team-taught performance component, will combine theoretical knowledge with practical hands-on experience to create a scaffolding approach to training. Rigorous science coursework will complement the educational training to help Certificate earners reframe the educational knowledge they gain in a science-specific context (e.g., how to teach complex scientific concepts using evidence-based, engaging, effective methods). *Note:* BIOL 810 will be the first in the series of coursework (first time course attendees, open to all students), and the second and third courses (EDUC 890 and EDUC 865 will be offered as select sections open only to admitted Certificate candidates who have completed previous coursework, or by special permission of instructor).

1) *Basic Biological and Biomedical Science Elective Course(s)* - (selected from preapproved list, typically in trainee's discipline, 3 cu) – Examples include the following (see Appendix I for course descriptions):

<b>Courses</b>	<b>Credits (c.u.)</b>
BCB 716 Bioinformatics and Sequence Analysis	1.0
BCB 720 Introduction to Statistical Modeling	3.0
BIOC 650 Basic Principles: From Basic Models to Collections of Macromolecules	1.5
CBIO 893 Advanced Cell Biology I	4.0
CBMC 805 Molecular Modeling	3.0
CBMC 807 Foundations of Chemical Biology: Organic and Medicinal Chemistry (CHEM 733)	3.0
GNET 621 Principles of Genetic Analysis 1 (BIOL 621)	3.0
GNET 631 Advanced Molecular Biology I (BIOC 631, BIOL 631, MCRO 631, PHCO 631)	3.0
MCRO 614 Immunobiology	3.0
MCRO 630 Virology	3.0
MOPH 810 Drug Metabolism	3.0
NBIO 722 Cellular and Molecular Neurobiology (PHYI 722, PHCO 722)	2.0
OBIO 730 Biological Concept: Introductory Extracellular Matrix Biology	1.5
PATH 713 Molecular and Cellular Pathophysiological Basis of Disease: Mechanisms of Disease	3.0
PHCO 701 Introduction to Molecular Pharmacology	3.0
PHYI 702 Experimental Physiology of Human Health and Disease	4.0

Alternative coursework may be approved on a case by case basis with program leadership. Science Elective courses may be completed at any time during participation in the Certificate program, or prior to applying. Ideally, however, these course(s) would be completed prior to applying for the Certificate—if so, these courses should have been completed within 3 years from the start of the Certificate program, and documentation should be provided when applying.

2) *Fall: Science Teaching Seminar (BIOL 810, 2 cu)* - (existing course description) - Over the semester, students will work in small groups with the course instructor and another UNC instructor to design an active learning session that they will implement in an undergraduate science class. Students will also explore the variety of college science teaching positions available via Skype with science instructors from a diverse set of colleges and universities. Finally, students will use their new understanding and experience with teaching to draft a teaching statement for future job searches. Practical activities will also include teaching observations, tutoring, and/or curriculum design each week. (Ideally taken: Certificate Program Year 1 Fall)

*Science Teaching Seminar – BIOL 810 Syllabus Attached*

3) *Curriculum Design Seminar (EDUC 890, 2 cu)* – Seminar in Education (existing course description) - 2 Credits. Required preparation, permission of the instructor. Provides for seminar treatment of appropriate topics. Repeat rules: May be repeated for credit; may be repeated in the same term for different topics.

*Proposed Syllabus Summary: Curriculum Design Seminar (Prerequisite BIOL 810):* Students will extend design principles learned in BIOL 810 to design an undergraduate course that they will later teach. Course design will include creation of learning objectives and syllabus; lesson plans; assessments; and all necessary materials to team-teach the newly developed course, which will be taught the following fall. Each team member will be individually responsible for developing and presenting one unit of course material in addition to all team members participation in co-designing the course as a whole. (Ideally taken: Certificate Program Year 1 Spring)

4) *College Teaching Internship (EDUC 865, 2 cu)* – College Teaching Internship (existing course description) - 1-3 Credits. Open to graduate students only. Permission of the instructor. This course is designed to give doctoral and masters' students experience at college teaching prior to taking on full responsibility for a class of her/his own. The student will fully participate as a teaching assistant in the class of an experienced tenured, tenure track, or clinical professor. Repeat rules: May be repeated for credit.

*Proposed Syllabus Summary: College Teaching Internship – (Prerequisite BIOL 810 & EDUC 890):* Students will apply design principles learned in BIOL 810 to team-teach an undergraduate course. Application will include delivering all lectures, assignments, and assessments, for the newly developed course. Each team member will be individually responsible for developing and presenting one unit of course material in addition to all team members participation in co-designing the course as a whole. The course design and topics will be chosen by the team in collaboration with the teaching mentor for each group, as appropriate to the students' scientific expertise and interests. This course will typically be an undergraduate course on campus at UNC Chapel Hill (e.g., Biology, Chemistry, Pharmacy courses) and would be coordinated with the appropriate department. (Ideally taken: Certificate Program Year 2 Fall)

*Individual Significant Teaching Experience (Internship & Observation):*

*Purpose:* The internship experience is intended to give Certificate participants the opportunity to implement best practices in science education, and to gain experience in a classroom setting. Additionally, this provides an opportunity to experience the culture and atmosphere of different types of institutions for potential future careers (e.g., research institutions vs. small liberal arts college vs. community college, private vs. public institutions; etc.). Ideally this requirement would be completed at a local institution other than UNC Chapel Hill (though not required) with an identified teaching mentor at the local institution. This may be completed through a variety of internship programs or other mentored teaching experiences (approved by request, reviewed by the Leadership Team).

*Individual Significant Teaching Experience (magnitude, mentorship):* The Teaching Internship may include a combination of leading lab and/or lecture courses (as fits best with the intern's previous teaching experience). Ideally, the intern should be the Instructor of Record (or Co-Instructor) for either a lab or a lecture course, with their mentor's assistance. This could also include guest lectures (i.e., in mentor's lecture, or in mentor's other course). The magnitude of time should be "significant" as determined by the Leadership Team. For example, including face-to-face, course prep, etc. the individual teaching experience could be measured as the equivalent of approximately 160 hours. Alternatively, this could be defined by level of responsibility which could range from teaching one full course (lab or lecture), to one half of a course (if co-taught); or co-teaching a smaller portion of two or three courses (if multiple, ideally with some continuity of teaching mentor). The individual significant teaching experience should

be overseen by 1-2 formal teaching mentors who agree to train and supervise the Certificate candidate.

*Expectations (“scope of work”).* Careful planning with clearly defined expectations should be discussed and documented, including number of hours expected for face-to-face classroom time/prep time (on-site vs. remotely; lecture vs. lab prep; office hours, if required; start and end dates of teaching experience; etc.) along with specified responsibilities of the student instructor. A 1-2 page document (e.g., “scope of work”) should detail the planned experiences and/or documents that the student will create as part of their teaching experience (e.g., number of lectures/lab session taught; deliverables such as: assignments, assessment, syllabus, or portions thereof). It is highly recommended that the intern request/coordinate opportunities to receive student evaluations (at minimum for end of course; mid-semester as well, if available) and to use this feedback toward the reflective learning process (e.g., to document evaluations, plan any changes, and reflect in teaching portfolio). Planning meetings and mentoring time should also be built into the document to the “scope of work” document to ensure the best possible experience for interns. Teaching experiences are typically completed in the fall, part time, over a full semester of 14-16 weeks; but could also be full or part-time combinations (e.g., shorter duration 4-6 week courses over the summer). Any scope of work document should include this information and be signed/validated by all parties (student/intern, teaching mentor/internship supervisor, and student’s advisor). Review and approval by all parties is intended to be sure that expectations are clear. It is recommended, though not required, that this be informally be evaluated by program leadership *prior* to the start of the teaching experience to obtain pre-approval as the individual significant teaching experience for the Certificate program. Once approved, this will be noted on the checklist and confirmed as “complete” at the conclusion of the experience.

*Teaching Observation (1 session):* At least one teaching observation should be formally completed, including written feedback from the trainee’s teaching mentor (pre- and post-meetings recommended). This will typically be the internship sponsor (teaching mentor), but could also be another faculty member or teaching advisor (approved by request). This does not need to be submitted separately, as long as its included in the “scope of work” document.

#### Teaching Document:

*Purpose:* The Teaching Document is intended to develop thoughtful consideration of teaching practices and/or teaching as research, and to document the Certificate participants’ understanding and competence in the respective areas. The Leadership Team will “accept” conditionally with revisions” or “reject” the submitted document (no grade will be assigned; it will simply be recorded as complete on the Certificate checklist).

Creation of ONE of the following will complete the capstone individual teaching experience:

- a) Reflective Teaching Portfolio *or*
- b) Teaching as Research (TAR) Project

Students may use a combination of their mentored teaching experiences, individual teaching experience, and/or other relevant teaching/outreach experiences to compose their reflective teaching portfolio or to plan and execute a teaching as research project in any of these settings (either in their own classroom or in collaboration with a mentor). The Portfolio can be composed of any relevant combinations the student wishes to highlight with their teaching philosophy, for example: sample assignment, assessments, or syllabi; course evaluations; teaching



observations/peer observations; pedagogical training summaries or lists of teaching/mentoring/outreach experiences, etc. The TAR project, for example, could be as simple as pre/post surveys surrounding an assessment or assignment, an empirical evaluation of a single activity or one-time presentation, or could include semester-long evaluations of an aspect of a course/class.

*Service (Recommended-Optional):*

*Purpose:* Service in a teaching-related club or organization would provide the trainee with additional experience that would be valuable as a future colleague in education. This is recommended, but optional.

Certificate earners may choose to serve for one term (~1 year) on an education or outreach related committee or as a club leader for an organization of their choice (e.g., TIBBS Advisory Board, Future Science Educators, DNA Day Connect, teaching conference planning committee, or other related activity considered on a case-by-case basis). This is optional.

**6. Provide a statement on the relationship of the Certificate Program to degree programs within the unit(s). To what extent will requirements for the Certificate overlap with requirements for bachelor's, master's or doctoral degrees? Confirm how course credit transfer policies will be applied to students.**

The only overlap will be with the basic science courses (3 c.u. total) which typically count toward science PhD requirements (30% overlap). The remaining coursework (BIOL 810, EDUC 890, and EDUC 865; 6 c.u. total) is unique to the Certificate Program. The remaining activities are specifically intended to supplement coursework, and are non-credit bearing.

**7. Will the Certificate Program be offered jointly with another university? If yes, describe the relationship with the joint unit.**

N/A

**8. Will the Certificate Program be offered on campus, as a distance education program, or a combination? Describe any distance education components in detail.**

There will be a combination of offerings, though the training portions of the program will be primarily on-campus, in-person. All required coursework and most activities will be offered on-campus, with the exception of:

- 1) Any off-site, in-person attendance at educational conferences or workshops chosen to fulfill workshop, seminar, or series hour recommendations
- 2) CIRTl Network opportunities which include a mix of on-campus and online activities (to be determined, UNC is in its first year as a CIRTl member and so the offerings are still being developed)
- 3) Teaching Internships will be conducted primarily at local institutions with identified teaching mentors, rather than on campus at UNC (this is intended to primarily rely on two- and four-year colleges, but could include K-12 by request); these placements will be conducted on a case-by case basis, with agreements implemented as needed by institution (a number of partnerships are already in place, and new partnerships will be explored as requested by interns during the placement process)

Any off-campus or distance learning options will be optional components, and the choice of which to participate in will be at the discretion of the student and may also be fulfilled by workshops offered on campus as an alternative. Off-campus internship partnerships are highly

recommended, but not required (for instance, if a student identifies a willing mentor on campus at UNC-CH).

**9. Describe the admissions criteria and process in detail. Differentiate between processes for degree-seeking students and non-degree-seeking students, where applicable. Include information about residency for tuition purposes as needed.**

The program will only be open to degree-seeking, matriculated doctoral students in the sciences. The application cycle will occur annually. A CV, statement of interest, and principal investigator approval letter will be required. Appropriate internship application materials/forms will also need to be completed pre-internship placement (e.g., ImPACT applications even for those pre-approved for funding through ImPACT, these will be used for placement purposes; if the internship requirement is completed through a different placement process, appropriate application materials should be completed as applicable). Judgment criteria will be for teaching potential and commitment to teaching as part of their career; program admissions will be competitive due to limited capacity.

The majority of coursework is expected to be completed in first and second years of the Certificate program or prior to that (coursework completed before acceptance into the program, within 3 years, will also count toward certificate completion if applicable). Mentored teaching would ideally be completed during Year 2, and the Teaching Internship would be completed as the capstone experience at any point thereafter (typically Year 3, or can delay to be completed as late as Year 4 or 5; internship must be after qualifying exams are complete and with principal investigator approval).

*Example Timeline:*

Program Year 0 - first or second year of grad school

- Complete basic science courses as part of science curriculum

- Complete recommended 10 hours of workshops, seminars, or series (optional)

Program Year 1 – second or third year of grad school

- Apply/accepted and complete BIOL 810 (Fall)

- Complete EDUC 890 (Spring)

Program Year 2 – third or fourth year of grad school

- Complete EDUC 865 (Fall) with mentored teaching experience

- Apply for internships (Spring)

- Attain internship placement/mentor and plan course/prep materials ahead (optional)

Program Year 3 – fourth or fifth year of grad school

- Complete Teaching Internship (Summer or Fall)

- Complete and submit Teaching Document (Fall/Spring)

- Service position (optional)

- Submit checklist of completion with supporting documents to fulfil requirements

*Note:* Teaching internships may be completed after a brief delay to accommodate degree progress. Timing should be coordinated to meet advisor's expectations (e.g., lab/principal investigator) to create the most optimal timing for the trainee, typically within 6 months to 1 year of the final coursework completion.

**To Apply:**

The application deadline for the Certificate in Science Education Program will be offered annually. The application requirements are:

1. A copy of current CV,
2. A list of the graduate courses taken with grades earned (an unofficial transcript or print out from Student Service Manager is ideal)
3. A 1-page statement interest in the program and current career goal(s), and
4. A letter from dissertation advisor stating their support of participation in the program

Recommended prerequisites: provide documentation of educational workshop participation – at least 10 hours (e.g., letter documenting attendance; certificate of completion).

Accepted candidates are expected to register for BIOL 810 upon acceptance to the Certificate program. In lieu of this they may provide documentation of current enrollment in or completion of Biology 810 within the past 3 years. Similarly, if science elective course has already been or is currently being completed, provide documentation of current enrollment in or completion of selected course as applicable. Documentation may include copy of course enrollment confirmation, unofficial transcript, etc. These will be reviewed along with application materials, and will also be used to update the Certificate checklist upon completion of all requirements (verified by the Leadership Team).

All application components, along with any questions, should be emailed to Program Coordinator, Rebekah Layton ([rlayton@unc.edu](mailto:rlayton@unc.edu)). Applications will be evaluated by a panel consisting of program leadership and representatives from our Advisory Board.

**10. Provide a three-year, semester-by-semester projection of enrollments and course offerings.**

Fall 2017	BIOL 810: College Science Teaching (4 of 15 students)
Spring 2018	EDUC 890: Curriculum Design Seminar (4 of 6 students)
Fall 2018	EDUC 865: College Teaching Internship (4 of 6 students)
Spring 2019	(no courses offered, internship planning/placement time)
Fall 2019	BIOL 810: College Science Teaching (4 of 15 students)
Spring 2020	EDUC 890: Curriculum Design Seminar (4 of 6 students)

*Note:* Electives already offered by departments will continue at the same rate as usual, and will not be affected by the Certificate Program.

**11. Provide a three-year projection of the Certificate Program's financial plan. Include the impact on campus resources, such as classrooms and instructional faculty/personnel. Also include plans for tuition and billing, if separate from standard rates across schools.**

*Courses:* The Certificate program does not provide any additional resources to cover the cost of courses. Courses can be taken as part of the student's approved course load to avoid additional charges, or cost can be covered by alternative funding source on a case-by-case basis (principal investigator, department, trainee, etc.).

*Faculty/Staff:* Jennifer Coble will be the primary instructor of BIOL 810 including providing mentored teaching opportunities on campus at UNC-CH. Other classrooms and faculty will not be impacted in excess of the usual coursework that may be obtained through electives in their respective departments. Jennifer Coble already teaches BIOL 810 and has previously taught versions similar to EDUC 890/EDUC 865 as part of the pilot program. The advanced sections will be offered on an as needed basis, with the two advanced semesters increasing as projected above. The primary instructor for EDUC 890/EDUC 865 will also be Jennifer Coble; however, if the demand increased or if this course load became unsustainable, other affiliated teaching mentors at UNC-CH may be identified to assist with BIOL EDUC 890/EDUC 865 as needed to meet demands as needed.

Rebekah Layton in the Office of Graduate Education will serve as the Program Coordinator for this Certificate. This will be part of her existing role as the Director of Training Initiatives in Biological and Biomedical Sciences in which she currently provides professional development opportunities for diverse career paths (including teaching-intensive careers).

*Internships:* Selected ImPACT teaching interns (up to 5 per year) will be offered through the ImPACT Internship program in the Office of Graduate Education. Funding from the Burroughs Wellcome fund in perpetuity will support the selected ImPACT Teaching Interns. Other internship opportunities will be evaluated on a case by case basis by request, no funding sources are associated with other internship opportunities.

**12. List all faculty members who will be responsible for planning and participating in the Certificate Program. Programs are encouraged to provide advising for students through the identification of one faculty member as the director of the Certificate.**

An Advisory Board consisting of faculty and staff from UNC and partner internship host schools will guide the program and evaluate applicants for acceptance. The initial Advisory Board will consist of the following individuals (3-year terms of service):

*College of Arts and Sciences, Biology Department*

Lillie Searles (Director)

Jennifer Coble (Co-Director)

Jean DeSaix

Mara Evans

*College of Arts and Sciences, Chemistry Department*

Brian Hogan

*School of Medicine, Biochemistry & Biophysics:*

Jeanette Gowen Cook

*School of Pharmacy*

Thomas Anthony Angelo

Adam M Persky

Jacqui McLaughlin

David Steeb

Stephen Eckel

*School of Education*

Janice Anderson

*The Graduate School*  
Brian Rybarczyk

*Center for Faculty Excellence*  
Molly Sutphen

*Office of Graduate Education*  
Rebekah Layton (Program Coordinator)

Program Director will be Dr. Lillie Searles, and Co-Director Dr. Jennifer Coble. Jennifer Coble will also be responsible for teaching BIOL 810 and mentoring students in EDUC 890/EDUC 865. Additional faculty may be sought out in the future to co-mentor students in these courses as needed.

### **13. Describe the evaluation plans for the Certificate Program.**

- *Student Evaluations*: Program participants will be surveyed about their experiences as part of the Certificate program, both along the way to provide immediate feedback at key points/events (e.g., event evaluations; internship surveys), as well as an overall evaluation at the conclusion of the Certificate program (e.g., program exit survey).
- *TIBBS Evaluations*: The Annual Training Initiatives in Biomedical and Biological Sciences survey evaluates programming offered over the past year and provides space for trainees to rate the value of training opportunities they have taken part in.
- *Office of Graduate Education Alumni Database*: The OGE tracks professional development outcomes of graduates, including their career choice post-graduation at various points in their career.

### **14. Appropriate letters of support should be included with the proposal. All units sponsoring and participating in a Certificate Program should approve the proposal and provide support letters, including letters from units supporting the Certificate through resources (e.g., faculty time, course slots). Approval letters from the home school should accompany the proposal submitted to the Graduate School for final approval.**

Please find attached Letters of support from Biology Department Chair, Dr. Vicki Bautch, and Associate Dean of Graduate Education, Dr. Jean Cook.

### **Appendices:**

Appendix I – Pre-approved Science Elective course list from BBSP

Appendix II – Example Electives

Appendix IIa - CIRTL Past Programming (2015)

Appendix IIb – CIRTL MOOC Syllabus “An Introduction to Evidence-Based Undergraduate STEM Teaching”

Appendix IIc – CIRTL MOOC Syllabus “Advancing Learning through Evidence-Based STEM Teaching”

Appendix IId – TIBBS Summer Series in Pedagogy (2015)

Appendix IIe – Elon Teaching Conference Schedule (2016)

Appendix IIf – Future Faculty Fellows Program (2015)

Appendix III – BIOL 810 Syllabus (Jen Coble)

Appendix IV –ImPACT Materials (Patrick Brandt)

Appendix IVa – ImPACT Application Materials

Appendix IVb – ImPACT FAQs

Appendix IVc – ImPACT Example (Redacted) Scope of Work

Appendix V – Certificate of Science Education Program Checklist

Appendix VI – Letters of Support

Appendix VIa – Biology Department support (Vicki Bautch)

Appendix VIb – Office of Graduate Education (Jean Cook)

## Appendix I: BBSP Course Descriptions

**BCB 716 BIOINFORMATICS AND SEQUENCE ANALYSIS (1).** BCB Core Module. This module introduces foundational statistical concepts and models that motivate a wide range of analytic methods in bioinformatics, statistical genetics, statistical genomics, and related fields. Students are expected to know single-variable calculus (differentiation and integration in 1 dimension), be familiar with matrix algebra and have some programming experience. The course will include material on partial differentiation of multiparameter functions, and use the statistical package R extensively. Familiarity with these will be an advantage but is not assumed. *Lecture Course*

**BCB 720 INTRODUCTION TO STATISTICAL MODELING (3).** BCB Core Module. This module is designed to introduce students to concepts and methods in the comparative analysis of nucleic acid and protein sequences, including sequence alignment, homology search, phylogenetics and genome assembly. *Lecture Course*

**BIOC 650 BASIC PRINCIPLES: FROM BASIC MODELS TO COLLECTIONS OF MACROMOLECULES (1.5).** Prerequisites, CHEM 430 and two semesters of physical chemistry or permission of the instructor. Basic molecular models and their use in developing statistical descriptions of macromolecular function. Course intended primarily for graduate students. *Lecture Course*

**CBIO 893 ADVANCED CELL BIOLOGY I (4).** Literature based discussion course on the application of modern approaches from multiple disciplines in Cell Biology. Emphasis is on small group discussion and dissection of primary literature including methods, scientific logic, and critical thinking. Maximum of 12 students are allowed in the class. Students not currently in Cell & Developmental Biology Department who are interested in this course should contact the course director prior to registering. *Paper Discussions*

**CBMC 805 MOLECULAR MODELING (3).** Prerequisites, MATH 231–232, CHEM 481, permission of the instructor. Introduction to computer-assisted molecular design (CAMD) of small molecules. Emphasis on the practical use of molecular and quantum mechanics programs (MM2, MNDO, GAUSSIAN). Two lecture and three to four laboratory hours a week. *Lecture Course/Lab*

**CBMC 807 FOUNDATIONS OF CHEMICAL BIOLOGY: ORGANIC AND MEDICINAL CHEMISTRY (CHEM 733) (3).** Prerequisite, CHEM 262 or equivalent. Elements of organic chemistry required for the design and synthesis of biologically active compounds. *Lecture/Paper Discussions*

**CHEM 732 ADVANCES IN MACROMOLECULAR STRUCTURE-ENZYME DESIGN AND ENGINEERING (3).** \*\*\*\* In-depth analysis of the structure-function relationships that govern fundamental biological processes. Topics vary year to year and may include replication, translation, RNA processing, macromolecular assemblies, natural product biosynthesis, enzyme catalysis, design and engineering. Pielak, Gary. TR 11–12:15pm. Kenan B125 \*\* For students who would like to strengthen their basic

## Appendix I: BBSP Course Descriptions

knowledge of Biochemistry. \*\*\*\* Strongly recommended for BBSP students interested in Biochemistry & Chemical Biology. *Paper Discussions*

**GNET 621 PRINCIPLES OF GENETIC ANALYSIS 1** (BIOL 621) (3). Fundamental principles of genetic analysis including mitosis and meiosis, linkage and mapping, recombination, mutagenesis, complementation, epistasis, bacterial genetics, transposable elements, genetics of mosaics, forward and reverse genetic techniques and genetic screening, genetic dissection of biochemical and signal transduction pathways, and gene cloning. *Lecture Class/Paper Discussions*

**GNET 631 ADVANCED MOLECULAR BIOLOGY I** (BIOC 631, BIOL 631, MCRO 631, PHCO 631) (3). DNA structure, function, and interactions in prokaryotic and eukaryotic systems, including chromosome structure, replication, recombination, repair, and genome fluidity. Three lecture hours a week. *Lecture Class/Paper Discussions*

**MCRO 614 IMMUNOBIOLOGY** (3). Prerequisites, a strong background in molecular biology, eukaryotic genetics, and biochemistry. Topics include immunochemistry; genetic mechanisms, and development of cells and cell interactions; hypersensitivity, autoimmunity, resistance to infection. *Lecture Course*

**MCRO 630 VIROLOGY** (3). Prerequisites, molecular biology and cell biology. Current concepts of the chemistry, structure, replication, genetics, and natural history of animal viruses and their host cells. *Lecture Course*

**MOPH 810 DRUG METABOLISM** (3). Permission of the instructor. Introduction to the use of concepts, chemistry, enzymology, and techniques in drug metabolism for the design and development of safe and effective therapeutic agents.

**NBIO 722 CELLULAR AND MOLECULAR NEUROBIOLOGY** (PHYI 722, PHCO 722) (2) Pre-requisites: basic undergraduate biology, chemistry, physics and intro calculus is assumed. Comprised of 6 blocks (MWF 10:10am-12:05pm), see below for first 3 blocks. *Lecture Course/Paper Discussions*

**OBIO 730 Biological Concept: Introductory Extracellular Matrix Biology** (1.5). This module (OBIO 730) focuses on the roles of extracellular matrices during normal development and disease and mechanisms of ECM during cellular and tissue growth and development, and processes associated with the structures and molecules which comprise craniofacial and related tissues.

**PATH 713 MOLECULAR AND CELLULAR PATHOPHYSIOLOGICAL BASIS OF DISEASE: MECHANISMS OF DISEASE** (3). This is a graduate course on cell injury and pathogenesis of disease with emphasis on basic mechanisms at the molecular, cellular, and organismal levels. The course objectives include: (i) to convey to students an understanding of various pathophysiologic processes, including cellular injury, inflammation, immune responses, neoplasia, hemodynamic disorders, and vascular disease, and (ii) to teach students to recognize and describe normal histology and



## **Appendix I: BBSP Course Descriptions**

histologic changes manifest in various pathophysiologic processes, including cellular injury, inflammation, immune responses, neoplasia, hemodynamic disorders, and vascular disease. This is a team-taught course. Members of the Pathology and Laboratory Medicine faculty and guest faculty lecturers present information on histology and pathologic mechanisms of disease. Course content is derived from the leading pathology textbook and primary literature. Student performance in the course will be assessed through in-class and take-home examinations.

### **PHCO 701 INTRODUCTION TO MOLECULAR PHARMACOLOGY**

(3). Permission of the instructor required. A first-year pharmacology course outlining the basic of molecular pharmacology, including molecular biology, bioinformatics, drug/receptor interactions, receptors and ion channels, regulation of second messengers, drug metabolism and system pharmacology. *Lecture Course*

### **PHYI 702 EXPERIMENTAL PHYSIOLOGY OF HUMAN HEALTH AND**

**DISEASE** (4). Students will learn the principles of cell, organ and systems physiology and pathophysiology required to identify and understand important areas of current biomedical research. Companion course to PHYI 703. Both courses will cover a variety of physiological systems (cardiovascular, neuro, respiratory, etc), and will emphasize examples of specific diseases (channelopathies, schizophrenia, hypertension, diabetes, etc) and current research opportunities. PHYI 702 will focus mainly on non-human model systems (cultured cells, mice, zebrafish, etc), while PHYI 703 (offered in the spring) will include many examples of approaches that utilize human samples or human genomics. In addition to lectures and ample time for in-class discussions, both courses will have a strong emphasis on the current research literature and will include journal-club discussion of assigned papers. *Lecture Course*



# CIRTl Network

*Committed to advancing the teaching of  
STEM disciplines in higher education*

Center for the Integration of Research, Teaching and Learning

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## Past Cross-Network Courses

Want to know more about what kinds of courses CIRTl offers? We have a full archive of past courses in the table below. Click on a course title to read a course description and instructor information.

You can find more information on [current courses here](#), and on [upcoming courses here](#).

### 2015-2016 ACADEMIC YEAR

#### Fall 2015

[Teaching with Technology](#)
[Diversity in the College Classroom:  
Teaching the STEM Undergraduate](#)
[Service-Learning in STEM  
Classrooms: Introduction to  
Pedagogy and Practice](#)
[Developing a Teaching Portfolio](#)
[Creating Assessments and Evaluation  
Plans \(Short Course\)](#)
[Students Reading Real Science](#)
[CIRTl MOOC: An Introduction to  
Evidence-Based Undergraduate STEM  
Education](#)

#### Spring 2016

[The College Classroom](#)
[Research Mentor Training](#)
[Teaching-as-Research](#)

#### Summer 2016

### 2014-2015 ACADEMIC YEAR

#### Fall 2014

[Teaching-As-Research: Scholarship of  
Teaching and Learning I](#)
[Diversity in the College Classroom](#)
[An Introduction to Evidence-Based  
Undergraduate STEM Teaching: A  
CIRTl College Classroom MOOC](#)
[Student Centered Course Design  
\(Short Course\)](#)
[The Active Classroom: Successfully  
Implementing Small-Group Learning  
in STEM Courses \(Short Course\)](#)
[CIRTl Reads Journal Club \(Short  
Course\)](#)

#### Spring 2015

[Teaching-As-Research: Scholarship of  
Teaching and Learning II](#)
[Research Mentor Training](#)
[The College Classroom](#)
[Basics of Online Learning and  
Teaching](#)
[CIRTl Reads Journal Club \(Drop In\)](#)

#### Summer 2015

[Online Assignments in STEM Courses:  
A Practical Guide](#)
[Basics of Online Learning and Teaching](#)
[Johns Hopkins Summer Teaching  
Institute](#)
[University of Colorado at Boulder  
Summer Teaching Institute](#)

### 2013-2014 ACADEMIC YEAR

#### Fall 2013

#### Spring 2014

#### Summer 2014

## Welcome

Welcome!

If you have questions, comments, or if you experience problems accessing these pages, please e-mail us at [info@cirtl.net](mailto:info@cirtl.net).

Preparing Future STEM Faculty to Meet the Needs of Culturally and Linguistically Diverse Populations	Teaching Science & Engineering through Debating Civic Issues	Planning Your Career: Developing Your Academic E-Portfolio
Small-Group Collaborative Learning	Preparing Future STEM Faculty to Meet the Needs of Culturally and Linguistically Diverse Populations	Basics of Online Learning and Teaching
Mini Course: Flipping - "A New Generation for Active Learning"	Exploring New Technologies for Active Learning: Maximizing Student Engagement	Effective Peer Instruction with Clickers
Mini Course: "What the Best College Teachers Do": A Discussion about College Teaching	Understanding and Implementing Scholaring Teaching Practices	
	Research Mentor Training	
	Mini Course: Teaching Training Learning Modules	
	Mini Course: CIRTL Service-Learning: Implementing Service-Learning in STEM Disciplines	

### 2012-2013 ACADEMIC YEAR

Fall 2012	Spring 2013	Summer 2013
The College Classroom	Teaching-as-Research in STEM Courses	CIRTL Basics of Online Learning and Teaching
Research Mentor Training	Developing a Teaching Portfolio	
Fall 2012 Course Flyer	Spring 2013 Course Flyer	

### 2011-2012 ACADEMIC YEAR

Fall 2011	Spring 2012	Summer 2012
The College Classroom	Diversity in the College Classroom	Developing a Teaching Portfolio
Inquiry-Based and Problem-Based Learning in the College Classroom	Effective Use of Technology in Teaching and Learning	Summer 2012 Course Flyer
Fall 2011 Course Flyer	Spring 2012 Course Flyer	

### 2010-2011 ACADEMIC YEAR

Fall 2010	Spring 2011	Summer 2011
Preparation for Teaching	Diversity in the College Classroom	
Research Mentor Training	Effective Use of Technology in Teaching and Learning	
Fall 2010 Course Flyer	Spring 2011 Course Flyer	

### 2009-2010 ACADEMIC YEAR

Fall 2009	Spring 2010	Summer 2010
The College Classroom	How Teams Work & How to Work Better in Teams	
Teaching and Learning Science - Revealing Student Thinking and Conceptual Obstacles to Learning	Effective Use of Technology in Teaching and Learning	
	Diversity in the College Classroom	

[Spring 2010 Course Flyer](#)

## 2008-2009 ACADEMIC YEAR

**Fall 2008**

**Spring 2009**

**Summer 2009**

[Diversity in the College Classroom](#)

[Effective Teaching with Technology](#)



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# An Introduction to Evidence-Based Undergraduate STEM Teaching

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## Course 1: An Introduction to Evidence-Based Undergraduate STEM Teaching

### An Introduction to Evidence-Based Undergraduate STEM Teaching

This course will be offered fall 2015. “An Introduction to Evidence-Based Undergraduate STEM Teaching” is an open, online course designed to provide future STEM faculty, graduate students and post-doctoral fellows with an introduction to effective teaching strategies and the research that supports them. The goal of the eight-week course is to equip the next generation of STEM faculty to be effective teachers, thus improving the learning experience for the thousands of students they will teach.

#### **Week 1 – Principles of Learning, Part 1**

We start by exploring a few key learning principles that apply in all teaching contexts such as student’s prior knowledge, mental models and knowledge organization. We’ll consider the research supporting these principles and examples of how STEM faculty put them into practice.

#### **Week 2 – Principles of Learning, Part 2**

This week we continue our exploration of learning principles that apply in all teaching contexts. These include, effective ways of providing feedback to students and student motivations for learning. We’ll consider the research supporting these principles and examples of how STEM faculty put them into practice.

#### **Week 3 – Learning Objectives**

Designing an effective learning experience for students means beginning with the end in mind. In this week, we will identify ways to craft meaningful learning objectives for one’s students and discuss strategies for incorporating those objectives in your instruction.

#### **Week 4 – Assessment of Learning**

Once we have outlined and implemented our learning objectives we must consider the most effective way of assessing those learning objectives. This week we will discuss strategies for designing assessments that will align with your learning goals as well as how student mindset can influence their performance on these assessments.

#### **Week 5 – Active Learning**

The module begins with a description of the benefits of active learning and how it fits into the overall learning cycle. Then, the module outlines two key features of active learning, teamwork and critical thinking, by showcasing several manifestations of active learning.

#### **Week 6 – Inclusive Teaching**

This week we will discuss the importance of inclusive teaching and many of the issues instructors can face when teaching classes composed of students of varying ethnicities and genders. We provide you with examples of teaching practices and language that can isolate certain student populations along with strategies to avoid these practices.

#### **Week 7 – Lesson Planning**

This week you will create an annotated lesson plan for a class you might teach in the future incorporating many of the principles covered in this course.

#### **Week 8 – Conclusion**

During the final week of the course, you’ll provide feedback to your peers on their draft lesson plans and, in turn, receive feedback on your lesson plan.

# Recommended Background

The course is intended for graduate students and post-docs in the STEM disciplines (science, technology, engineering, and mathematics) planning faculty careers who are interested in developing their teaching skills. We expect that current STEM faculty, particularly early-career faculty, will find the course useful, as well. Others interested in undergraduate STEM teaching are welcome to participate.

## Course Format

The course will feature **videos** of various types, including explanatory videos on evidence-based learning principles and teaching practices, case studies featuring interviews with faculty and students and scenes from classrooms, and discussion videos with small groups of faculty and graduate students discussing their teaching. These videos are designed to introduce concepts and techniques from the literature on teaching and learning and to show how STEM faculty have applied these ideas in their own classrooms.

To help participants better understand these research-based teaching practices and start to apply them to their own teaching contexts, each week will also feature a number of questions for participants to consider and discuss in the **course forums**. Participants will be encouraged to reflect on their personal experiences in the classroom (as learners or as teachers) and to explore how teaching and learning plays out differently across disciplines and across various higher education institutional contexts. The peer-to-peer interactions on the discussion forums are a critical piece of the learning experience in this course.

**Weekly quizzes** will give participants an opportunity to check their understanding of the teaching concepts and practices introduced each week. There will also be several **peer-graded assignments** during the course, including the final lesson planning assignment, providing participants with a deeper level of practice and feedback. The quizzes will provide a fairly comprehensive assessment of your understanding of course material, while the peer-graded assignments will focus more on your ability to apply key skills from the course. Your grade in the course will be the higher of your quiz average and your peer-graded assignment average. You're welcome to do all the graded work—or focus on just one type, quizzes or peer-graded assignments.

Please note that, even though quizzes will be made available weekly, the deadline for quiz completion won't be until the final day of the course, so you can complete these on your own pace. The peer-graded assignments, on the other hand, will require you to stay “on schedule” since these assignments require their own deadlines for assignment submission and peer feedback.

As noted above, learning communities are at the heart of CIRTl's activities. We encourage course participants to find or create **local learning communities**, as well, meeting in person during the course to share and discuss what they are learning about STEM teaching. If you're interested in hosting a group of students or colleagues on your campus to participate in this course together, we would love to hear from you! We will provide suggested discussion questions and activities for local learning communities to use during weekly meetings, and the communities in turn will be asked to share their ideas and perspectives with the global learning community created by the course. See our page on [facilitating a MOOC-supported learning community](#) for more information and to sign up as a host.



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An introduction to Evidence-Based Undergraduate STEM Teaching

# An Introduction to Evidence-Based Undergraduate STEM Teaching

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## Course 2: Advancing Learning Through Evidence-Based STEM Teaching

### Advancing Learning through Evidence-Based STEM Teaching

This course will be offered starting summer 2016. This eight-week course prepares science, technology, engineering, and mathematics (STEM) instructors to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers.

#### *About the Course*

This course will provide graduate students and post-doctoral fellows in the STEM disciplines (science, technology, engineering, and mathematics) who are planning college and university faculty careers with an introduction to “teaching as research”—the deliberate, systematic, and reflective use of research methods to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers. Participants will learn about effective teaching strategies and the research that supports them, and they will learn how to collect, analyze, and act upon their own evidence of student learning.

The course will draw on the expertise of experienced STEM faculty, educational researchers, and staff from university teaching centers, many of them affiliated with the [Center for the Integration of Research, Teaching, and Learning \(CIRTL\)](#), a network of 21 research universities collaborating in the preparation of STEM graduate students and post-docs as future faculty members. The eight-week course will be highly interactive, with many opportunities for peer-to-peer learning. Learning communities are at the heart of CIRTL’s activities, and this open, online course is intended to foster a large, healthy learning community of those interested in undergraduate STEM teaching—including current STEM faculty.

“Advancing Learning through Evidence-Based STEM Teaching” has been developed by faculty, staff, and students at [Vanderbilt University](#), [Michigan State University](#), [Boston University](#), and the [University of Wisconsin-Madison](#). The course is based on work supported by the National Science Foundation under Grant No. 1347605.

#### *Week 1 – Teaching as Research, Part 1*

We start by exploring Teaching as Research, an approach to evidence-based teaching in which instructors collect, analyze, and act upon evidence of learning as they design and facilitate learning experiences for their students.

#### *Week 2 – Learning through Diversity*

As we consider how learning works in our classrooms, we can’t assume all our students think and learn alike. This week, we discuss strategies for teaching inclusively and for leveraging the diversity of perspectives among one’s students as a strength in the classroom.

#### *Week 3 – Cooperative Learning, Peer Instruction*

The evidence is persuasive: active learning instruction fosters more and deeper student learning than traditional lecturing. How can we create active learning environments in our classrooms? This week, we explore two approaches: cooperative learning and peer instruction.

#### *Week 4 – Inquiry-Based Labs, Problem-Based Learning*

This week we continue our discussion of active learning instruction with modules on inquiry-based labs (lab structures and assignments that teach students to think like scientists and engineers) and problem-based learning (focusing student learning through concrete and challenging problems).



### *Week 5 – The Flipped Classroom*

How can we make time during class for active learning instruction? That is the question that motivates the idea of the flipped classroom. This week, we'll explore the flipped classroom as a way to make more intentional and effective use of class time—and engage our students in deeper learning.

### *Week 6 – Teaching as Research, Part 2*

We return to the topic of Teaching and Research this week, with practical strategies for framing a research question, collecting evidence of student learning, analyzing assessment data, and drawing conclusions that inform future teaching.

### *Week 7 – Project Design*

This week you will design a Teaching as Research project you might conduct in the future, one that incorporates principles and practices covered this course.

### *Week 8 – Conclusion*

During the final week of the course, you'll provide feedback to your peers on their Teaching as Research project designs and, in turn, receive feedback on your project design.



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An introduction to Evidence-Based Undergraduate STEM Teaching



# TIBBS 2015 TIBBS Summer Series: Certificate in Teaching

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It's time for our Summer Series on Pedagogy! Students, postdocs, faculty, and staff who attend the first two kick-off sessions, the final wrap-up session, and at least 3 of the remaining sessions will receive a certificate of completion, and certificate earners will qualify for a drawing to receive a collection of books on pedagogy in higher education. (Please note that this version of the schedule is the final version, which includes a few scheduling changes.)

## Session 1 | Kickoff Workshop on Interactive Team Learning Thursday, July 9, 3:00-5:00 pm in MBRB G-202

Presenters | **Lisa Bullard, PhD**, Teaching Professor in Chemical Engineering & Director of Undergraduate Studies, NCSU

An expert in teaching effectiveness and course design with team-learning components, this workshop will cover the following topics and more:

- Why should I use team-based learning strategies to enhance learning?
- How can teams be used both within and outside the classroom?
- How should I assign teams?
- How can I assess team and individual effectiveness?
- What does the research say about team-based learning?

## Session 2 | Learning Assessment Tuesday, July 14, 3:30-5:00 pm in MBRB G202

Presenter | **Ed Neal, PhD**, President of Ed Neal and Associates, past Director of Faculty Development, UNC

## Session 3 | Using Process Oriented Guided Inquiry Learning (POGIL) for Interactive Undergraduate Laboratories Thursday, July 16, 3:30-5:00 pm in MBRB G202

Presenter | **Tom Freeman, RN, PhD**, Lecturer, Chemistry Department, UNC

## **Session 4 | Developing your Teaching Statement, Portfolio, and Application Materials** **Tuesday, July 21, 3:30-5:00 pm in MBRB G202**

Presenter | **Brian Rybarczyk, PhD**, Director of Graduate Student Academic & Professional Development, Lecturer, Department of Biology, UNC

## **Session 5 | Managing the Classroom** **Thursday, July 23, 3:30-5:00 pm in MBRB G202**

Presenter | **Todd Zakrajsek, PhD**, Executive Director of the Academy of Educators in the UNC School of Medicine, UNC

## **Session 6 | Designing a Syllabus** **Tuesday, July 28, 3:30-5:00 pm in MBRB G202**

Presenter | **Jennifer Coble, PhD**, Lecturer, Department of Biology, UNC

## **Session 7 | Teaching our First Undergraduate Course** **Thursday, July 30, 3:30-5:00 pm in MBRB G202**

Presenters | Panel of Past and Present Spire Scholars

- **Erin Shanle, PhD**, Current SPIRE Scholar
- **S. Alex Marshall, PhD**, Current SPIRE Scholar
- **Kim Monahan, PhD**, Former SPIRE Scholar and Instructor of Biology at the North Carolina School of Science and Mathematics
- **Jason Andrus, PhD**, Former SPIRE Scholar and Associate Professor at Meredith College

## **Session 8 | Wrap-Up: Workshop in Active Learning** **Tuesday, August 4, 3:00-5:00 pm in BOND H G100**

Presenters | **Richard Felder, PhD** Hoest Celanese Professor Emeritus of Chemical Engineering, NCSU and **Rebecca Brent, EdD**, President of Education Designs, Inc.

Highly sought-after speakers Drs. Felder and Brent have taught hundreds of workshops on effective teaching and mentoring methods. This workshop will cover the following topics and more:

- How can I get students actively engaged in learning, even with large class sizes?
- How can I avoid common pitfalls?
- What does research say about active learning?

Please register by Monday, July 6th to attend. To register, visit <http://tinyurl.com/mz5rfj4>

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# TLC16

## Teaching & Learning Conference



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### Program

Registration begins at 8:00am

*\*\*Schedule subject to change\*\**

### Welcome & Opening Plenary: 8:45 – 10:15

**Dr. Dan Willingham, Professor of Psychology**  
**University of Virginia**

Dr. Willingham has been teaching for over 20 years. His research investigates learning, memory, attention, and the application of cognitive psychology to college and K-12 education. His writing can be found in the “Ask the Cognitive Scientist” column for *American Educator* magazine, and he is the author of *Why Don’t Students Like School?*, *When Can You Trust the Experts?*, and *Raising Kids Who Read*.

**Evaluating Scientific Research that Applies to Education – LaRose Digital Theater (Koury Business Center, Room 101)**

### Morning Workshops & Presentations: 10:30 – 11:45

Morning workshops will begin after a short break with refreshments.

<b>Workshop: Structuring the Classroom for Inclusive Teaching</b>	<b>Workshop: Design Thinking and Evidence-Based Learning</b>	<b>Workshop: Facilitating Metacognition in the College Classroom</b>	<b>Workshop: Designing and Assessing Integrating Learning Across Disciplines using Cross-Course Projects</b>	<b>Presentation: Near-Term Assessment: Leveraging Technology Tools for Assessing Students’ Learning</b>
Viji Sathy & Kelly Hogan – UNC Chapel Hill	William Moner, Rebecca Pope-Ruark, Joel Hollingsworth, and Phillip Motley – Elon University	Jennifer Eidum Zinchuk – Elon University	Sally A. Wasileski – UNC Asheville	Adam Barger – College of William & Mary
Room 355	Room 242	Room 244	Room 306	Room 211
				<b>Presentation: Becoming a SAMR-ai</b>
				Michael Vaughn – Elon University
				Room 211
<b>Workshop: What is this Intentional</b>	<b>Workshop: Using Boring Old Test Data</b>	<b>Workshop: Going Public With Teaching</b>	<b>Workshop: Eliciting Effective Feedback in</b>	<b>Presentation: Fresh, Local, Good: A New</b>

Learning Thing?	to Enable Transfer into Meaningful Domains	and Learning	Peer Assessment	Model for Librarian-Faculty Collaboration
Laura Pipe & Jennifer Stephens – UNC Greensboro	Scott Windham – Elon University	Deandra Little – Elon University	Ed Gehringer – NC State University	Patrick Rudd & Paula Patch – Elon University
Room 200	Room 310	Room 302	Room 208	Room 353
				<b>Presentation: “I Won’t Use JSTOR All the Time”: Assessing Instruction to Meet Student Needs</b>
				Jamane Yeager – Elon University
				Room 353

## Lunch & Unconference Sessions: 12:00 – 1:00

TBD

TBD

TBD

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Per the Unconference format, flip charts will be set up at the morning registration table for you to suggest or tag a topic for discussion during lunch. The most popular topics will be assigned a room, and signs will be posted near the lunch buffet tables with information about room locations. This section of the website will also be updated. After grabbing a plate, select a topic and head to the assigned room for an informal discussion over lunch.

## Afternoon Workshops & Presentations: 1:15 – 2:30

### Workshop: Urban Legend or Practical Pedagogy: Return of the Teaching Ninjas

Alyssa Archer, Candice Benjes-Small, & Susan Van Patten – Radford University

Room 355

### Workshop: Retooled: How We Revised a Grammar Competency Exam for Education Majors into a Learning Opportunity for Everyone

Paula Patch – Elon University

Room 302

### Workshop: Coding Student Learning in the Humanities: “Close Reading” for Teaching and Learning

Olivia Choplin, Ketevan Kupatadze, Kristina Meinking, Brandon Essary, Robin Attas, & Shawn Tucker – Elon University

Room 306

### Workshop: Redefining Participation: How Well Did You Do? How Much Did I Help?

Steven Benko & Julie Schrock – Meredith College

Room 244

### Presentation: Evidence of Learning through Practice Question Notebooks

Rachel Riskind – Guilford College

Room 211

### Presentation: Elon Kickbox – A Personal Innovation Kit for Student Makers

Michael Vaughn, Dan Reis, & Alexandra Strelow – Elon University

Room 211

### Workshop: Deliberative Dialogue in the Classroom

Mary Jo Festle – Elon University

Room 242

### Workshop: Designing High Quality Internships

Pam Kiser – Elon University

Room 200

### Workshop: Data Visualization for Non-Programmers

Li Li – Elon University

Room 354

## Closing Plenary: 2:45 – 3:45

A Tale of Two Classes: Adventures in Modularized Curriculum, Low-Stakes Testing, and Flipping

**J. Todd Lee & Kristina Meinking, Elon University**  
**LaRose Digital Theater (Koury Business Center, Room 101)**

Learning is a tricky thing. For both students and faculty, beliefs about learning often run contrary to an ever-growing volume of evidence in the cognitive and educational sciences. In this session, we explore the theory and practice of having students demonstrate and reflect upon their learning. Although we teach Math and Latin, two subjects which students particularly fear and loathe, the approaches and techniques we discuss can be woven into the fabric of any course. In particular, we explore how technology, both new and old, can be used to travel an evidence-based path of learning marked by peer collaboration, low-stakes, formative assessments, and carefully crafted modules.

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## TEACHING AND LEARNING

[Programming and Events >](#)

[Teaching and Technology >](#)

[Consultations >](#)

[Resources for Faculty >](#)

[Resources for Graduate Students >](#)

## GRADUATE STUDENT FELLOWSHIP PROGRAM (GSFP)

The CFE and the Graduate School invite applications to the Graduate Student Fellowship Program. The joint Graduate School and CFE program provides graduate students with a unique opportunity to learn about faculty development. Based on Fellows' experiences, goals, and skills, Fellows will be assigned to work with CFE staff members from one of the CFE program areas: Teaching and Learning, Research, or Leadership. Each Fellow will assist the CFE staff member with ongoing programming as well as complete a project on faculty development. In turn, the CFE staff members will provide professional development to Fellows to help them meet their career goals.

Admission to the GSF Program is competitive; information on the position and application process is available [here](#). Please **download the application**, fill it out, and email it to Donna Bailey, CFE Graduate Student Teaching and Learning Consultant, following the instructions at the top of the application. Instructions for the letter of recommendation are found [here](#). As part of the GSFP, each Fellow is expected to assist staff with CFE programs and activities, reflect on their own goals and objectives for the fellowship, and complete a project on a faculty development topic. For questions about eligibility, please contact Donna Bailey ([dbailey1@email.unc.edu](mailto:dbailey1@email.unc.edu)).

**Program dates for Fall 2017 to be announced.**

## FUTURE FACULTY FELLOWSHIP PROGRAM

The Future Faculty Fellowship Program (FFFP) is a semester-long program that introduces graduate students to evidence-based teaching practices, helps them understand the roles and responsibilities of faculty members at different types of institutions of higher education and helps them reflect on their professional goals.

Eligible students must (a) be enrolled in a graduate program at UNCCH; (b) have a commitment to an academic career; and (c) be assigned to teach as an independent instructor (Teaching Fellow) in the upcoming academic year at UNC or have a faculty sponsor who will allow the student to design, teach, and assess at least three contact hours of class time in one of the sponsor's courses. An "independent instructor" has complete responsibility for planning a course, developing course materials, selecting texts, conducting classes, designing and administering tests and other assessments, and grading the students. For questions about eligibility, please contact Molly Sutphen ([msutphen@email.unc.edu](mailto:msutphen@email.unc.edu)).

Admission to the FFFP is competitive; information on the application is available [here](#).



Please download it, fill it out, and email it to [Trisha Bienvenu](#), CFE Administrative Support Specialist and Program Coordinator, following the instructions at the top of the application. Instructions for the letter of recommendation are [here](#). As part of the FFFP, each fellow is expected to attend CFE workshops on teaching and learning, participate in a graduate student learning community, submit a teaching statement, complete an exercise on faculty roles and responsibilities in different types of universities and colleges, and deliver a final presentation. Each fellow who completes the course receives an honorarium of \$450.

Important dates for Fall 2017 cohort

- |               |  |
|---------------|--|
| • February 24 | Call for applications                          |
| • March 29    | Applications and Letters of Recommendation due |
| • April 21    | Notification of acceptance                     |
| • August 25   | Kickoff event                                  |

---

## GRADUATE STUDENT OFFICE HOURS

Each week, [Donna W. Bailey](#), the Graduate Student Teaching and Learning Consultant offers office hours to discuss anything related to teaching and learning. These are drop-in times that are available to help graduate students and post-docs, although it is a good idea to let me know so that I do not have too many people show up at one time.

The office hours are in Davis Library, Research Hub, Cube 4 at the following times:

Mondays 12 noon — 2 pm  
Wednesdays 1:30 pm — 3:30 pm  
Thursday 10 am — 12 noon

Other times can be arranged if these standard times do not work for you. Virtual interaction via Skype is also available. Most often, graduate students have questions about classes they are teaching or about their job search activities. If you are not sure about an area of interest or need, plan to drop by. If I do not know the answer, I can usually find it.

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## WORKSHOPS

CFE staff offers four workshops each semester geared toward the needs of TAs and graduate students who are Instructors of Record. Topics include:

- Aligning learning goals, assessment and grading rubrics
- Creating an environment for learning
- Using formative and summative assessment
- Writing a Teaching Statement

Go [here](#) to register.

---

## NEW TA ORIENTATION

New TAs are invited to take an online course designed to prepare them for their dual role as a teacher and a student. Course topics include:

- Preparing for the first day of class
- University policies governing instructor and student conduct
- General pedagogical issues such as overcoming apathy in the classroom and grading student work
- Challenges that international TAs face

The course is offered in [July](#) and [January](#).

### FOR MORE INFORMATION

**Molly Sutphen, Associate Director and Teaching  
and Learning Coordinator**  
**Phone: 919-966-4838**

[EMAIL](#)

316 WILSON LIBRARY, CB# 3470  
CHAPEL HILL, NC 27599-3470  
PHONE: 919-966-1289  
FAX: 919-962-5236

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**BIOL 810: College Science Teaching**  
Fall 2016  
Wednesdays 1pm-2pm in 218 Wilson Hall

**Instructor:** Jennifer Coble

jcoble@bio.unc.edu

Phone: 962-3705 (office), 210-5161 (cell)

Office: 110 Wilson Hall - Office hours: Tues & Thurs from 2pm-4pm and by appt.

**SEMINAR DESCRIPTION**

This interactive seminar will provide the knowledge and skills required to design and implement active learning in college science courses. Over the semester, you will work in small groups with myself and another UNC instructor to design an active learning session that you will implement in an undergraduate science class. You will also explore the variety of college science teaching positions available as we Skype with science instructors from a diverse set of colleges and universities. Finally, you will use your new understanding and experience with teaching to draft a teaching statement for your future job searches.

**DRIVING QUESTIONS**

- Why is student-centered teaching and active learning more valuable than lecture-focused instruction?
- How do I decide what to teach? How do I determine learning goals?
- How can I assess students' achievement of learning goals?
- What resources can support my teaching?
- What active learning strategies can I use in my classroom?
- How can I support students in reading primary literature?
- What kinds of college science teaching jobs are available?
- What should I include in my teaching statement/philosophy?

**ATTENDANCE**

Attendance will be expected for all students who audit or register for the course. All sessions are also open to those who do not officially audit or register. Because sessions build on one another, please e-mail me if you miss a class to get class materials.

**COURSE ASSIGNMENTS**

In this seminar, we will meet face to face for one hour each week from 12pm-1pm. You will also be required to spend at least one additional hour on activities that will support understanding of one of our driving questions. All assignment will be discussed in class and posted to Sakai.

**Readings**

A few articles will be assigned throughout the semester to support learning goals. These will be posted on Sakai and will usually be accompanied by guided reading questions. Students are expected to have read course readings before class and come prepared to discuss and apply ideas.

**Teaching Observations**

All students will observe at least two science classes over the course of the semester, take notes on the active learning strategies they observe and how the strategies supported students mastery of learning goals.

**Student Centered Class Session**

Over the semester, you will work in a group to plan one active learning class for a UNC course of your choosing. Your class session lesson plan will include learning goals, assigned readings and guided reading questions, formative assessments to be implemented in class and some summative assessments questions to assess mastery of your learning goals in the next exam.

**Teaching statement:**

Draft a 1-2 page personal teaching statement, customized to the type of job that they plan to pursue.

## BIOL 810 Class Chart

Below is a tentative class chart. Please see Sakai for the most up-to-date chart.

<b>Class</b>	<b>Date</b>	<b>Driving Question</b>	<b>Assignment (due before class)</b>
<b>1</b>	<b>Aug 31</b>	What are the goals for undergraduate science education?	Student questionnaire
<b>2</b>	<b>Sept 7</b>	Why is active learning seen as best practice?	Active learning intro video and reading
<b>3</b>	<b>Sept 14</b>	How do you plan for active learning? What are some active learning strategies?	Active Learning Class Observations
<b>4</b>	<b>Sept 21</b>		
<b>5</b>	<b>Sept 28</b>	How can I assess students' achievement of learning goals?	Class session learning objectives
<b>6</b>	<b>Oct 5</b>		Class session assessment proposal
<b>7</b>	<b>Oct 12</b>	Active Learning Class work sessions	Class session plan update
<b>8</b>	<b>Oct 19</b>		Class session plan update
<b>9</b>	<b>Oct 26</b>		Class session plan update
<b>10</b>	<b>Nov 2</b>		Class session plan update
<b>11</b>	<b>Nov 9</b>	How do I draft an effective teaching statement?	Class session plan update
<b>12</b>	<b>Nov 16</b>	How can I engage undergraduate students in reading primary literature?	Class session plan update
<b>13</b>	<b>Nov 18</b>	What should be included in an effective teaching statement?	Teaching statement brainstorm
	<b>Nov 25</b>	No class - Happy Thanksgiving!	
<b>14</b>	<b>Dec 2</b>	What are the expectations of science instructors at different colleges and universities?	Teaching Statement Draft
<b>15</b>	<b>Dec 9</b>		Teaching Reflection

**Certificate of Science Education Checklist:  
Application for Certificate Completion Approval (v02.09.2017)**

**Completion of Requirements**

**Prerequisite (10 hours)\*:**

- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)

**Coursework (9 cu)\*:**

- ☐ BIOL 810 – Level I
- ☐ BIOL 810 – Level II
- ☐ BIOL 810 – Level III
- ☐ Transcript attached

**Internship\*:**

- ☐ Intern Title: \_\_\_\_\_  
Name of institution: \_\_\_\_\_  
Name of mentor: \_\_\_\_\_  
Course(s) taught: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)

- ☐ Teaching Observation: \_\_\_\_\_  
Name of institution: \_\_\_\_\_  
Name of mentor: \_\_\_\_\_

- ☐ Teaching Document (attached, circle one):  
Teaching Portfolio  
Teaching-as-research Project

**Optional:**

- ☐ Service Obligation (1 yr): \_\_\_\_\_

\* Required components to earn Certificate

# TIBBS ImPACT Internships

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## Experiential Learning: ImPACT Internships, Site Visits, & More

Experiential learning is offered in a number of ways to UNC trainees. A first step may be to attend an event planned by a career cohort to hear from an invited guest in one's career field of interest, and perhaps attending a subsequent networking lunch to explore perspectives of the career track from a more personal vantage point. But then what?

**Site Visits:** We are collaborating with the National Institutes of Environmental and Health Sciences ([NIEHS](#)) and [Duke](#) University to develop the **Enhancing Local Industry Transitions Through Exploration (ELITE) Consortium**. Site visits through the **ELITE Consortium** are intended to assist trainees in gaining exposure to industry environments and skills, as well as to provide opportunities to network with industry scientists and organizational policy experts. In addition, we hope that the **ELITE Consortium** will foster networking among trainees cross-institutionally.

Other experiential learning opportunities include [DNA Day](#) or [DNA Day CONNECT Programs](#), gaining administrative and committee planning experience as a **TIBBS Advisory Board Member**, or gaining leadership experience as part of a [Career Cohort](#). These are just a few examples, the possibilities are endless!

For a capstone experience consider an **ImPACT Internship**: a self-designed, tailored internship in any field of the trainee's choosing, at a partner company, institution, or organization of one's choice. Read on to learn more!

## ImPACT Internships

**(2017 application period is open with a 2/8/2017 priority deadline)**

The **ImPACT Internship** program was designed to be as flexible as possible in allowing you to complete an internship in the career area of your choice. We have set up a number of [partnerships with organizations](#) that are willing to host interns, but you may identify your own unique opportunity at an organization that is not on

this list.

The Office of Graduate Education will fund about 30 160-hour internships each year. If you are able to identify an externally funded internship, the length of the internship can be chosen through conversation between you, your PI, and the hosting organization. Please note that your selection to be funded as an **ImPACT Scholar** will not guarantee that you will find a match in an organization of your choice. We will provide resources to help you identify a hosting organization, but it is the responsibility of the awardee to identify and secure an internship opportunity.

Both UNC and NIH will be evaluating this program rigorously. If you are selected to participate in this program, you will be expected to participate in surveys to provide feedback regarding the program and its effect on your training.

### **Your application for an internship requires the following materials:**

- Complete the [Online Internship Application](#)
- Email the following 3 documents to Patrick Brandt ([pdb@unc.edu](mailto:pdb@unc.edu)) by midnight on Feb 8th 2017.
  - Signed, scanned copy of the [Faculty Mentor Consent Form](#)
  - Personal Statement (1-2 pages single spaced max) that addresses why you want to be an ImPACT scholar and how you anticipate that you will benefit from your participation in an internship. Please also include your research area of interest and how this may influence your choice of internship location.
  - Current CV

Congratulations to our past and current [ImPACT interns](#)!

## **Want to learn more?**

Many previous ImPACT interns are open to discussing their experience applying, setting up internships, and actually being an intern. [Click here](#) for an ONYEN-protected file with their internship assignment and most recent contact information.

1. Please check [here for general trainee FAQs](#) about internships!
2. Please check [here for general PI FAQs](#) about internships!
3. Please check [here for an FAQ sheet for internship providers](#)!

ImPACT interns in the news:

- [ImPACT press release, 2014](#)
- [ImPACT Interns in UNC's Vital Signs](#), summer 2016
- [ASBMB Online article, summer 2016](#)

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# UNC ImPACT

Immersion Program to Advance Career Training

## Internship FAQs for Trainees

### 1. In what career areas are internships available?

There are internship opportunities in the following broad career areas:

- a. Business Development and Entrepreneurship
- b. Technology Transfer
- c. Science Policy
- d. Industry Research and Development
- e. Teaching Intensive Careers
- f. Outreach, Research/Program Administration
- g. Science/Medical Writing

### 2. Which companies/organizations will be hosting interns?

The list of hosts is always growing and includes institutions in RTP such as [BD](#), [EPA](#), [RTI](#), [Rho](#), [Sigma Xi](#), [ETSI](#), [AgBiome](#), [Bayer Crop Science](#), [NCBC](#), [NC Board of Science and Technology](#), [Parion](#), [NIEHS](#), [UNC Office of Tech Dev](#). For an up to date list of internship providers please go to <http://tibbs.unc.edu/unc-impact-program/unc-impact-program-internship-partner-list/>. See also question #12 below.

### 3. Can graduate students AND postdocs participate?

Yes! Both grad students and postdocs are eligible for funded internships. Graduate student must have passed their qualifying exam. We anticipate funding about 30 internships this year, with  $\frac{3}{4}$  of those being graduate student internships. Faculty mentor consent is required for grad student and postdoc interns.

### 4. Who pays for the internship? How are trainees compensated during the internship?

ImPACT is funded through an [NIH BEST grant](#), university funds, and industry partnerships. Graduate students' and postdocs' salary level will not change during the internship. The Office of Graduate Education will coordinate with your department finance and HR contacts to move the trainee's stipend/salary/fees/health insurance to another source for the time corresponding to the internship.

### 5. Will my health insurance be affected?

Trainees on UNC-sponsored health insurance plans (ie. Student Health Plan or Postdoc Medical Insurance Plan) will have uninterrupted coverage during the internship. Other health insurance plans should not be affected either.

### 6. How long does an internship last?

ImPACT can fund a trainee for 160 hours. How those hours are used is up to the trainee, the faculty mentor, and the company/organization. Some companies prefer a full time arrangement (which would last roughly 4 weeks). Some companies prefer a part time arrangement. Companies have the option to extend the internship if all parties are in



agreement (including the faculty dissertation advisor) and if the organization is funding the internship.

**7. When will the internships start?**

Full time ImPACT internships should take place during the summer. ImPACT encourages part time interns to begin their internship during the summer and all internships in this round need to be completed by December 31<sup>st</sup> 2017.

**8. How do I apply for the internship?**

The application process consists of two phases – 1) an internal UNC application wherein trainees are chosen by the ImPACT leadership team (deadline is February 1<sup>st</sup>, 2017), and 2) placement of the internal winners with one of our internship providers. Besides completing an online application, trainees must also submit the following documents.

- a. Signed and scanned Faculty Mentor Consent Form (blank form available at: <http://tibbs.unc.edu/wp-content/uploads/2015/07/PI-Consent-Form-ImPACT-2016.pdf>).
- b. A personal statement that addresses what career path they are preparing for, and how their career development will benefit from an internship.
- c. Current CV

**9. When is the phase 1 application deadline?**

All components for phase 1 of the application must be received by the end of the day February 1<sup>st</sup>, 2017.

**10. If my phase 1 application is chosen am I guaranteed an internship spot?**

There is no guarantee that trainees who pass phase 1 will be chosen by an internship provider since each provider will make the final placement decision. That said, ImPACT will only accept the number of trainees we believe we can place with internship hosts. We will help broker relationships, and each internship provider has already stated an interest in hosting an intern. If for some reason a trainee does not secure an internship they will have an automatic internship slot the following year and will not have to reapply to the internship program.

**11. If I pass phase 1 of the application process how am I matched with an internship provider?**

ImPACT will make introductions and help set up interviews between interns and potential internship supervisors based on matches in experience and interest. It is ultimately your responsibility to set up the internship and it will require effort on your part. We will do our best during phase 1 to not introduce unneeded competition into the internship matching process. Trainees are also encouraged to do their own research on companies/organizations as described in FAQ #12.

**12. If I pass phase 1 of the application process can I arrange an internship with a company not listed in FAQ #2 above? If so, is there funding for it?**

Yes, of course! You are encouraged to find your own internship providers outside of the list we have made arrangements with. We will help you set up the logistics and answer questions the company may have.

**13. Can international trainees participate in ImPACT internships?**

International students on F-1 and J-1 visas are eligible to participate fully in ImPACT internships. Postdocs on F-1 and J-1 visas are likewise eligible. Unfortunately, postdocs on H1-B visas are not eligible. Any international scholar who is placed with an internship host must contact the UNC Office of International Student and Scholar Services as soon as the internship details are finalized in order to update their SEVIS profile.

**14. Can I “keep projects going” in my lab by coming in on nights and/or weekends while doing my internship?**

Yes! And we encourage you to do this so that the time spent on your internship does not negatively affect your time to degree and/or your publication records. We also encourage you to meet with your faculty mentor to develop a set of realistic goals and expectations for your effort in the lab during the internship period. Note this is especially critical if you are doing a part time internship where the 160-hour internship is spread out over several months.

**15. I’m worried that my faculty mentor won’t allow me to do an internship.**

ImPACT directors have explained the program during many department faculty meetings. In a survey of active training faculty, 85% of faculty said they would be “highly likely” or “likely” to allow their trainees time off to do a full-time, one-month paid internship. The number willing to support you during a part-time internship is likely higher.

**16. Do I need to report my time in an ImPACT internship on my Annual Effort Report?**

The US government recently stated that predoctoral and postdoctoral trainees paid on any federal grants (NIH, NSF, DoD, etc) are expected to engage in career development activities. This means that even if you are paid by your faculty mentor’s federal research grant you are not expected to devote 100% of your effort to working at the bench. For more information see

[http://sciencecareers.sciencemag.org/career\\_magazine/previous\\_issues/articles/2014\\_12\\_17/caredit.a1400315](http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2014_12_17/caredit.a1400315)

**17. I’m on a federally funded individual fellowship (ex. NIH-F-31, NIH-F-32, NSF-GRFP). Can I still do an internship?**

Quite likely. The government policy mentioned in FAQ #16 grants you the ability to engage in career exploration and professional development as a fellowship awardee. ImPACT will help you describe the goal of the internship and the logistics to your program officer in an effort to get their approval. Since 2014 5 out of 6 ImPACT interns on individual fellowships were allowed to remain on their fellowship.

**18. What if I get accepted into a non-ImPACT, paid internship program on my own? Would you like to know about it?**

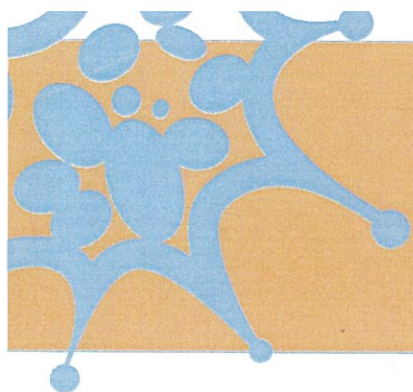
Absolutely! There are many national internship programs that hire life science graduate students. Most are 3 months long or longer and they can be quite competitive so if you have been accepted into one of them, Congratulations! Even if your internship is outside of ImPACT we would like to hear about it for a few reasons:

- We may be able to help you answer questions about leaves of absence, non-disclosure agreements, conflict of interest statements, and other common internship forms you may be asked to sign.
- We would like to learn what other internship programs are doing to prepare trainees for the job market with the hope that we can implement the most beneficial aspects into ImPACT internships.
- We would like to compare the effect of internship length and other internship parameters with job placement, time to degree, and other factors important in career development.

**19. Is there a place I can go for more information about the ImPACT program?**

- ImPACT section of the TIBBS website: <http://tibbs.unc.edu/unc-impact-program/>
- Press release announcing UNC's ImPACT award:  
<http://news.unchealthcare.org/news/2014/october/life-after-dissertation>.
- Summer 2016 Vital Signs piece:  
<https://news.unchealthcare.org/news/2016/june/the-new-impact-initiative-puts-phds-on-the-path-toward-successful-science-careers>
- ASBMB Today article, summer 2016:  
<http://www.asbmb.org/asbmbsmbtoday/201605/Education/>

**If you have a question that is not answered here please contact Dr. Patrick Brandt at [pdb@unc.edu](mailto:pdb@unc.edu)**



# UNC ImPACT

Immersion Program to Advance Career Training

## Internship Scope of Work

**Name of Intern:** \_\_\_\_\_

**Preferred Email Address of Intern:** \_\_\_\_\_

**Home Department:** Microbiology and Immunology

**Dissertation Advisor at UNC:** \_\_\_\_\_

**Internship Host Institution (name and address):** William Peace University; 15 E Peace St, Raleigh, NC 27604

**Internship Supervisor at Host Site:** Jenny Hayden and Lisa Bonner

**Contact information for Primary Internship Supervisor (email and office phone):**

Jenny Hayden: 814-883-3297; jhayden@peace.edu

Lisa Bonner: 919-508-2348; lisa.bonner@peace.edu

**Internship Start Date:** August 18<sup>th</sup>, 2016

**Internship End Date:** December 16<sup>th</sup>, 2016

**Expected hours per week:** 10 (16 weeks total)

### Internship Description:

\_\_\_\_\_ will assist Dr. Jenny Hayden with the Genetics course and lab at William Peace University. She will serve as the instructor of record for one section (the Thursday 3:30 to 6:15 lab section).

\_\_\_\_\_ will be expected to attend and assist in one section of lecture (Thursdays from 11:00 to 12:15).

Occasionally, if it is necessary for a specific unit, \_\_\_\_\_ will also attend the Tuesday lecture from 11:00 to 12:15. Following lecture, Dr. Hayden will instruct the first lab section from 12:45 to 3:30.

During this time, \_\_\_\_\_ will observe the lab section, assist as needed, and prepare for the second lab section. This will give \_\_\_\_\_ the opportunity to see the labs before teaching the next section.

In addition to teaching one lab section, \_\_\_\_\_ will work with Dr. Hayden as she develops the lecture and lab materials for the course. The goal of this aspect of the internship is to gain skills in syllabus and exam development, course design, and lesson planning. This will include weekly meetings over the summer in which \_\_\_\_\_ will draft and co-edit the course and lab syllabi. \_\_\_\_\_ will serve as a guest lecturer for four course periods throughout the semester. Before the lectures, \_\_\_\_\_ will work with Dr. Hayden to develop lesson plans and activities. During these guest lectures, Dr. Hayden will observe \_\_\_\_\_ and provide feedback on her teaching.

**What deliverables are expected at the end of the internship?**

- Completion of instruction of a Genetics lab section consisting of about 7 students as instructor of record.
- Guest lecturing four times throughout the semester in the Genetics course.
- Development of course materials: exam questions, primary literature discussions, and activities for both lab and lecture for use in later Genetics courses.

The deliverable list above may be modified by mutual consent of supervisor and intern at any time in the process.

**Signature of Intern:**

8/1/2016

**Signature of Internship Supervisor:**

James P. Hager 8-9-16

**Signature of Dissertation Advisor:**

8/1/2016

**Certificate of Science Education Checklist:  
Application for Certificate Completion Approval**

**Completion of Requirements**

Prerequisite (Optional - Recommended, 10 hours):

- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)
- ☐ Workshop/Session/Course Title: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)

Coursework (9 cu)\*:

- ☐ Science Course Elective (3 CU)
- ☐ BIOL 810: College Science Teaching (2 CU)
- ☐ EDUC 890: Curriculum Design Seminar (2 CU)
- ☐ EDUC 865: College Teaching Internship (2 CU)
- ☐ Transcript attached

Internship\*:

- ☐ Intern Title: \_\_\_\_\_  
Name of institution: \_\_\_\_\_  
Name of mentor: \_\_\_\_\_  
Course(s) taught: \_\_\_\_\_  
\_\_\_\_\_ # hours completed (documentation included)

- ☐ Teaching Observation: \_\_\_\_\_  
Name of institution: \_\_\_\_\_  
Name of mentor: \_\_\_\_\_

- ☐ Teaching Document (attached, circle one):\*
- Teaching Portfolio
- Teaching-as-research Project

Optional:

- ☐ Service Obligation (1 yr): \_\_\_\_\_

\* Required components to earn Certificate





UNC  
COLLEGE OF  
ARTS & SCIENCES

THE UNIVERSITY  
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March 28, 2017

Academic Policy Committee  
The Graduate School  
University of North Carolina at Chapel Hill

Dear Committee Members,

The Biology Department is pleased to support the exciting addition of the proposed Certificate Program in Science Education. This would provide valuable training experiences for doctoral students to gain teaching expertise and experience, which will be valuable both to them as scholars, future potential colleagues in faculty positions, and educators of the next generation of scientists. With Biology Department leadership in the Certificate Director and Co-Director of the program, we are invested in the success of the Certificate program and are happy to provide the departmental sponsorship of the Certificate going forward, with administrative support from the Office of Graduate Education. Furthermore, with representation across departments and schools across the University on the Certificate Advisory Board, including the College of Arts and Sciences, School of Medicine, School of Education, Eshelman School of Pharmacy, The Graduate School, the Center for Faculty Excellence, and the Office of Graduate Education, the widespread collaboration and support will enable this program to develop and even perhaps expand in the future. This Certificate represents an innovative and needed development to support training science educators and future faculty on campus using experiential learning components like mentored teaching, and we are happy to support this new program.

Sincerely Yours,

Victoria L. Bautch, Ph.D.  
Beverly Long Chapin Distinguished Professor and Chair of Biology



UNC  
SCHOOL OF MEDICINE  
*The Office of Graduate Education*

March 29, 2017

Academic Policy Committee  
The Graduate School  
University of North Carolina at Chapel Hill

Dear Committee Members,

The Office of Graduate Education is excited to support the proposed Certificate Program in Science Education, which will benefit our biological and biomedical doctoral students to allow them to train and gain experience as science educators. The proposed program would provide the unique ability to combine pedagogical training, scaffolding of teaching responsibilities, mentored teaching experiences, and an individual experiential teaching component. In addition to increasing the skills of trainees in the classroom, this program will provide them with an important tool to display their skills and make them stand apart as applicants on the tenure track job market and other teaching-intensive career paths. The Certificate program will be especially useful to trainees interested in pursuing teaching-intensive careers, for example those interested in careers as faculty at liberal arts colleges, and particularly to those who may want to gain teaching experience and expertise without needing to supplement their training with an additional teaching postdoc (e.g., needing to complete Institutional Research and Academic Career Development Awards program type of fellowships to supplement training with additional teaching experience). The Office of Graduate Education would be thrilled to have the University offer this valuable additional training experience to our biological and biomedical graduate population, and more broadly to scientists in training for whom this coursework and experiences are relevant. We are happy to support such a program by providing a Program Coordinator to assist with the creation of the Certificate in Science Education program. Please feel free to contact me if you have any additional questions.

Sincerely,

Jean Cook, PhD  
Associate Dean of Graduate Education  
Professor of Biochemistry and Biophysics