

biology and another engineering discipline), but for exceptional candidates this will not be a requirement. Students with backgrounds in other biology-related fields, as well as with physics or chemistry emphasis, could also be appropriate. The key characteristic is a combination of the numerical/quantitative together with the biological.

Traineeships are available to doctoral students in the School of Engineering and in the School of Science. We seek applicants equally focused on biology and mechanics, emphasizing their intimate integration. Faculty mentors are drawn from the Schools of Engineering and Science to emphasize the interdisciplinary nature of the program. Funds are available for four new trainees each year. Students will apply during their 1<sup>st</sup> or 2<sup>nd</sup> years of graduate study at MIT, to be selected based on their MIT coursework and research potential and interests.

### Eligibility Requirements

Doctoral students of good standing in one of the participating departments and who have clearly indicated an interest in biomechanics research will apply for the MCTB Traineeship at the end of their first or second year of graduate study, depending on their home department. Applicants must be US citizens or permanent residents.

Applications for Traineeships will consist of an MIT graduate student application in addition to a short (2-page) thesis proposal and two letters of recommendation. These will be evaluated by a Trainee Admissions Committee. Support will begin the following July.

### Program Course Requirements

All students admitted into the program will be expected to have an undergraduate major in one of the engineering departments or, if non-engineering, that they have mathematics up to and including a course in differential equations. Similarly, students entering from engineering

departments will be expected to have taken courses in molecular biology and biochemistry. Again, this has been our standing requirement for the Masters Degree Program in Biological Engineering. If they have not, they will be expected to take either 7.05, General Biochemistry, or 5.07, Biological Chemistry, and 7.012, Introduction to Biology, before enrolling in our core subjects.

Trainees will need to satisfy the requirements of their home department. In addition, they will be required to take the following courses:

***BE.410J Molecular, Cellular, and Tissue Biomechanics, and***

***BE.430J Fields, Forces, and Flows in Biological Systems, and***

***One graduate elective in biomechanics, beyond the core, and***

***7.56 Foundations of Cell Biology, or***

***7.58 Molecular Biology***

### Teaching experience in Biomechanics

Trainees are expected to gain some experience in teaching as part of their formal training. Two opportunities exist. An intensive summer course in molecular and cellular biomechanics is offered to students at numerous universities and industry. Teaching assistants in this course will all be expected to attend lectures and work with the summer school faculty, serving as teaching assistants for the two-week program. Alternatively, Trainees can satisfy this requirement by serving as Teaching Assistant for one term in one of our biomechanics subjects here at MIT.

### Program Faculty

Faculty	Department	Role
Roger Kamm	BE & MechE	Core Faculty
Mark Bathe	BE	Core Faculty
C. Forbes Dewey	BE & MechE	Core Faculty
Alan Grodzinsky	BE & EECS	Core Faculty
Matthew Lang	BE & MechE	Core Faculty
Douglas Lauffenburger	BE	Core Faculty
Christine Ortiz	DMSE	Core Faculty
Peter So	BE & MechE	Core Faculty
Subra Suresh	DMSE & BE	Core Faculty
Bruce Tidor	BE & EECS	Core Faculty
Krystyn Van Vliet	DMSE	Core Faculty
Patrick Doyle	ChemE	Affiliated Faculty
Lorna Gibson	DMSE	Affiliated Faculty
Rakesh Jain	Harvard Medical School	Affiliated Faculty
Richard Lee	Harvard Medical School	Affiliated Faculty
Ioannis Yannas	MechE, BE, DMSE	Affiliated Faculty

### Student Seminar Series

Each trainee is required to present a half-hour talk on his/her thesis research progress and ongoing plans in the BE Student Seminar Series. This series is held Wednesdays at noon, before an audience drawn from the BE faculty and the full spectrum of students and postdocs in their laboratories regardless of their own disciplinary programs.

### MCT Biomechanics Journal Club

Trainees will be expected to participate in a monthly journal club devoted more broadly to biomechanics research and directed by the BTP faculty on a rotating basis. Attendance at the Biomechanics Journal Club will be required of all trainees. Each trainee will, in turn, select and present for open discussion, a recent publication of particular relevance to their own research. All trainees, however, will be expected to read all papers and participate in the discussion. A primary purpose of the Journal Club will be to teach students how to critique a scientific paper and come to appreciate what constitutes a well-conceived and well-executed research study

### Annual Retreat

Each year, the Biological Engineering Division holds a 2-day off campus retreat for faculty, graduate students and staff. This activity is viewed by the students as the high point of the year, and provides them with an opportunity both to present their own work, generally in poster format, and also to hear from selected faculty in the broader field of biological engineering. Moreover, there is always an evening discussion focusing on professional practice and ethics; for example, one past discussion dealt with social and ethical issues involved in stem cell research and technologies. Some of the trainees will be enrolled in the BE

doctoral program, and will automatically be expected to attend the BE Retreat

### Application Procedures and Deadlines

Trainees will be selected from the students admitted to the participating departmental doctoral programs. Students wishing to apply to the Biomechanics Training Program should submit (i) a two-page thesis proposal, (ii) a copy of their MIT graduate application (plus a recent CV if appropriate), (iii) a transcript of their grades since arriving at MIT and (iv) letters from two faculty members familiar with their research. From among the applicants, a smaller group may be invited to interview in person.

The breadth of interests should extend beyond those of a single-departmental Ph.D. program, and thus this group of trainees represents a unique student pool on the campus at MIT. Students are selected for their demonstrated outstanding academic and research qualifications, leadership, and communication skills.

### Applications should be submitted to:

Annmarie Donovan  
Room NE47-318  
agd@mit.edu  
617-253-6236

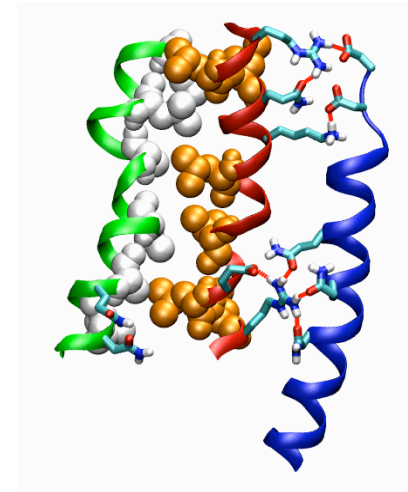
Questions can be addressed either to Annmarie Donovan or Prof. Roger Kamm (rdkamm@mit.edu).

Applications are accepted until June 10 and students will be informed by July 20.

# Molecular, Cell and Tissue Biomechanics Training Grant

## *Program Description and Guide for Applicants*

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<b>Administrative Director:</b> agd@mit.edu	<b>Annmarie Donovan</b> Rm. NE47-318



### Overview of the Program

The Molecular, Cell and Tissue Biomechanics Training Grant (BTG) is intended for students with a compelling interest and drive in solving problems at the interface of mechanics and biology. Generally students will have an educational background with a focus in two areas (such as biology and mechanical engineering, biology and materials science, or