Williams College

Linkages between Education and Research at a Liberal Arts College

Summer Science Students

Summer Science Program (SSP)

6/26 - Sunday	6/27 - Monday	6/28 - Tuesday	6/29 - Wednesday	6/30 - Thursday	7/1 - Friday
6:00 p Pizza Meeting	9:00 a Orientation 12:00 p Lunch 12:30 p Math Placement 4:30 p Intro to Faculty 5:00 p Photos 5:30 p BBQ with SHSS	9:15 a English Materials 10:00 a Financial Aid 12:00 p Lunch 12:30 p Lecture 1:00 p Computer Lab 8:00 p Problem Solving	8:30 a Math 10:15 a Chemistry 12:15 p Lunch 4:00 p Biology	9:00 a English 11:00 a Biology 12:00 p Lunch 1:00 p Chemistry Lab 8:00 p Problem Solving	8:30 a Math 10:15 a Chemistry 12:15 p Lunch Faculty Tutor Lunch 7:00 p Dr. Payne

7/2 - Saturday					riday
Stone Hill Hi					a Math
1:00 PM Dr. Payne					a Chemistry
					p Lunch
					Faculty Tutor Lunch
7/3 - Sunday					
7:00 PM Biology Quiz					
7/9 - Saturday					Friday
					a Math Exam
					a Chemistry
					p Lunch
					Faculty Tutor Lunch
7/10 - Sunday					p Dr. Payne
7:00 PM Biology Quiz					
7/16 - Saturday					Friday
7:00 PM Dr. Payne					a Math
					A Chemistry
					P Lunch
7/17 - Sunday					P Leave for Mystic
7:00 PM Biology Quiz					

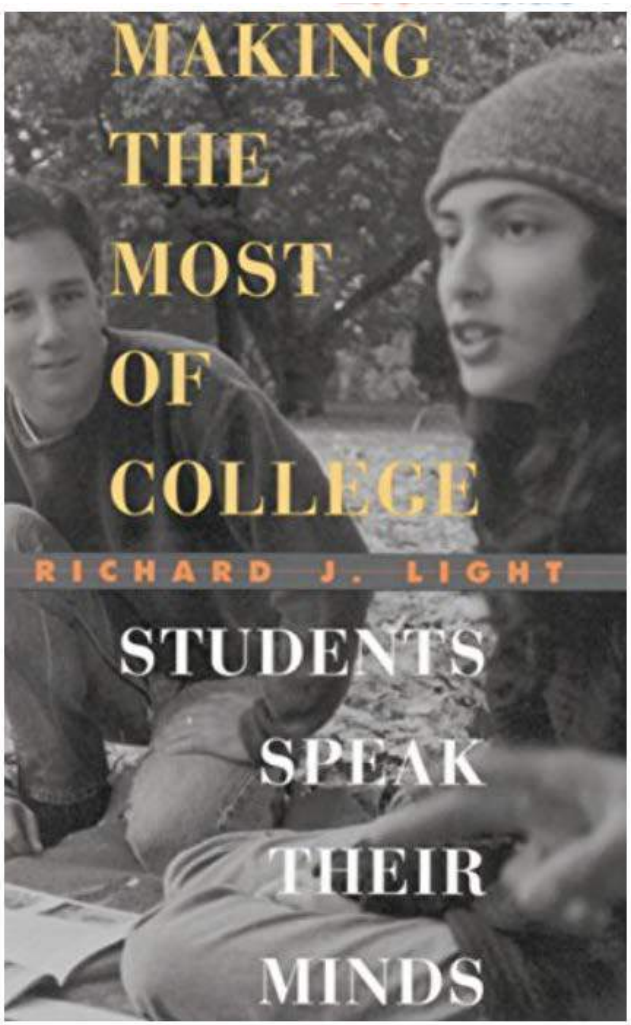
		8:00 p Problem Solving		8:00 p Biology Exam	
7/23 - Saturday	**7/25 - Monday**	**7/26 - Tuesday**	**7/27 - Wednesday**	**7/28 - Thursday**	**7/29 - Friday**
Mystic Trip	8:45 a Math Final 10:15 a Chemistry 12:15 p Lunch 1:00 p Chemistry Lab	9:00 a English 11:00 a Biology 12:00 p Lunch 12:30 p Lecture 1:00 p Chemistry Final	8:00 a Conferences 1:30 p Conferences EM Lab 7:00 p Pictures 7:30 p Theater	Faculty Tutor Lunch 3:00 p Dr. Payne 5:00 p Barbeque	Return Home

Achieving Success in Undergraduate Research

First set of principles

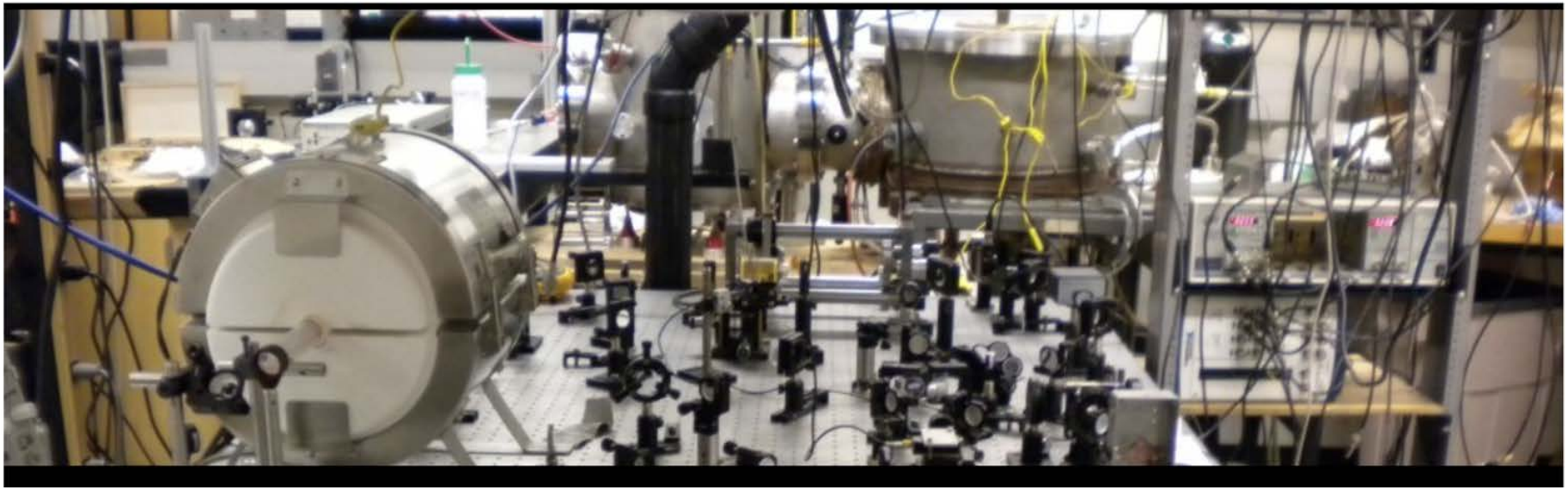
- ➔ Start Early
  - ◆ "We hope that participation in SSP motivates participants to pursue research opportunities at Williams or elsewhere and that participants ultimately explore careers in science research and science education."
- ➔ Remove Financial Barriers
- ➔ Collaborative Effort
- ➔ Direct Faculty Contact!

10 year study of student success at Harvard College



Majumder Lab at Williams College

High-precision diode laser spectroscopy of Group IIIA atoms



2018

Bingyi Wang

"High-precision atomic structure measurements in In and Pb using atomic beam and vapor cell spectroscopy"

Achieving Success in Undergraduate Research

- ➔ Start Early
- ➔ Remove Financial Barriers
- ➔ Collaborative Effort
- ➔ Direct Faculty Contact!

Second set of principles

- ➔ Non-credit Opportunity
- ➔ Continuity
- ➔ Teach to Learn

The Program

Program Overview
Funding
Denning House
Meet the Scholars

Bingyi Wang

Xuzhou, China

Physics, School of Humanities and Sciences

Bingyi Wang, from Xuzhou, China, will pursue a PhD in physics at Stanford School of Humanities and Sciences. At Williams College, she will earn a bachelor's degree in physics and mathematics, and has served as a teaching assistant in the physics and Asian studies departments, as a researcher on studies in laser spectroscopy, as a board member on the Minority Coalition and the International Club, and as co-chair of Women and Gender Minorities in Physics and Astronomy. Bingyi also plays Zheng, a string instrument, arranges for the Williams Chinese Music Ensemble, and is a classical opera vocalist.

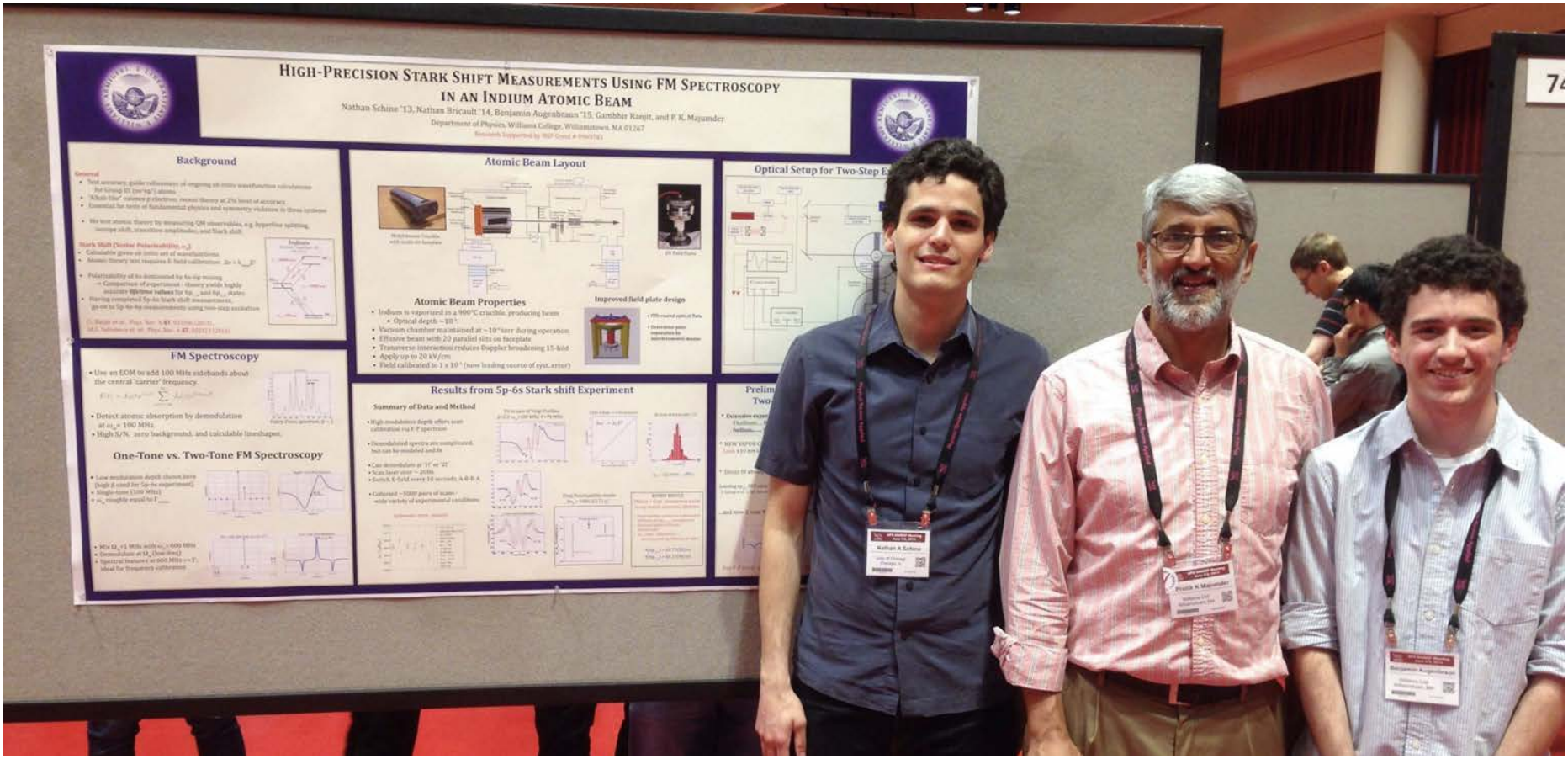
Overall, about 79% of Williams students report feeling either generally satisfied or very satisfied with opportunities to participate in research.

Achieving Success in Undergraduate Research

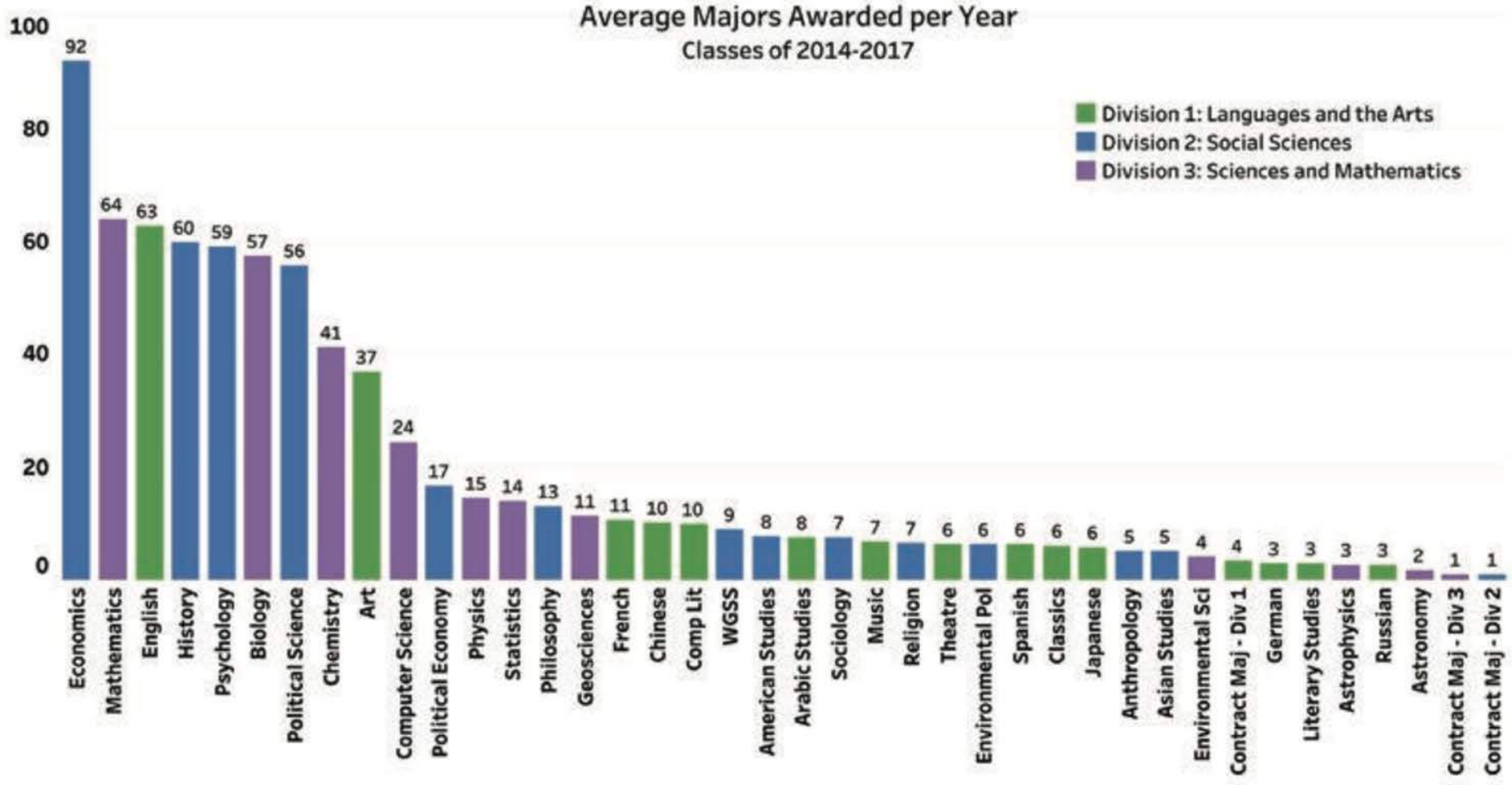
- ➔ Start Early
- ➔ Remove Financial Barriers
- ➔ Collaborative Effort
- ➔ Direct Faculty Contact!
- ➔ Non-credit Opportunity
- ➔ Continuity
- ➔ Teach to Learn

Third set of principles

- ➔ Capstone Projects
- ➔ Presentation and Publication


HIGH-PRECISION STARK SHIFT MEASUREMENTS USING FM SPECTROSCOPY IN AN INDIUM ATOMIC BEAM
Nathan Schine '13, Nathan Bricault '14, Benjamin Augenbraun '15, Gimbhir Ranjit, and P. K. Majumder
Department of Physics, Williams College, Williamstown, MA 01267
Research Supported by NSF Grant # 0968743
Background
Atomic Beam Layout
Atomic Beam Properties
Improved field plate design
Optical Setup for Two-Step Ex
FM Spectroscopy
One-Tone vs. Two-Tone FM Spectroscopy
Results from 5p-6s Stark shift Experiment
Summary of Data and Method
Nathan A Schine
Benjamin Augenbraun
74

Williamstown, Massachusetts


Average Majors Awarded per Year
Classes of 2014-2017
Division 1: Languages and the Arts
Division 2: Social Sciences
Division 3: Sciences and Mathematics
100
80
60
40
20
0
92
64
63
60
59
57
56
41
37
24
17
15
14
13
11
11
10
10
9
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4
4
3
3
3
3
2
1
1
Economics
Mathematics
English
History
Psychology
Biology
Political Science
Chemistry
Art
Computer Science
Political Economy
Physics
Statistics
Philosophy
Geosciences
French
Chinese
Comp Lit
WGSS
American Studies
Arabic Studies
Sociology
Music
Religion
Theatre
Environmental Pol
Spanish
Classics
Japanese
Anthropology
Asian Studies
Environmental Sci
Contract Maj - Div 1
German
Literary Studies
Astrophysics
Russian
Astronomy
Contract Maj - Div 3
Contract Maj - Div 2

Student Enrollment

	Undergrad	Graduate
Total	2,030	54
Men	1,076	23
Women	954	31

- Undergraduate Non-U.S. enrollment: **8%**
- Undergraduate U.S. minority enrollment: **40%**

Class of 2021 Admission Statistics

- Applied: **8,593**
- Admitted: **1,253**
- Percent admitted: **15%**
- Entered: **548**

Faculty

- Total number of instructional faculty: **364**
- Tenured faculty as a percentage of total faculty: **54%**
- Percent of the faculty with doctorates or other terminal degrees: **92%**

Achieving Success in Undergraduate Research

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- ➔ Direct Faculty Contact!
- ➔ Non-credit Opportunity
- ➔ Continuity
- ➔ Teach to Learn
- ➔ Capstone Projects
- ➔ Presentation and Publication

END

Annual Budget Calendar

In its thirty-first summer in 2018, the Summer Science Program (SSP) provides an enriching and intensive five-week immersion in science, mathematics, and English for a talented group of incoming Williams students who are excited about science and who are from groups historically underrepresented in the sciences and/or first-generation college students.

The goals of the program are to promote and encourage continuing participation in science and science-related studies at Williams, and to provide program participants with a preview of the Williams experience. We hope that participation in SSP motivates participants to pursue research opportunities at Williams or elsewhere and that participants ultimately explore careers in science research and science education.

It has long been recognized that a positive undergrad- uate research experience is the single most important inspiration for future scientists. As documented in this report, more than 250 students were engaged in science research with Williams faculty this year. Many students conducted independent research projects during the ac- ademic year with 91 completing theses and 171 were engaged in full-time research with Williams science faculty during the summer of 2016. Dozens of Williams students participated in conferences where they present- ed the results of their research, and at least 50 students co-authored publications in peer-reviewed journals in the past academic year.

SHSS


Williamstown, MA
Buffalo
Detroit
Boston
Cleveland
New York
Pittsburgh
Columbus
Philadelphia
Baltimore
Virginia Beach
45°N
40°N
80°W
75°W
70°W
65°W


SAILING


MYSTIC, CT

WILLIAMS MYSTIC

The Maritime Studies Program of
Williams College and Mystic Seaport

- Williamstown, Massachusetts (pop. 8k)
- 3 hrs. from Boston and NYC
- Established in 1793
- Liberal Arts Curriculum
- Arts and Languages
- Social Sciences
- Science and Mathematics
- Student-Faculty ratio is 7:1
- 2000 undergraduates; 50 grad.
- 300+ faculty
- Endowment = $2.6B