

WSIA : Wabash Summer Institute in Algebra

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WABASH
COLLEGE

Wabash Summer Institute in Algebra (WSIA)

- Run by Profs. Axtell, Phillips, and Turner
- Funded by National Science Foundation
 - 2005 – 2007
- Eight-week research experience
 - 5 June – 29 July 2005
 - 4 June – 28 July 2006
 - 3 June – 27 July 2007 (?)
- Abstract Algebra
- Undergraduate mathematics majors from around the country

WSIA's Goals

- 1 To provide a meaningful mathematical research opportunity for undergraduates who are less likely to have a research-oriented experience than other student populations;
- 2 To encourage participants to attend graduate school in the mathematical sciences, and to provide them with some of the tools and confidence necessary to succeed there;
- 3 To provide the support and framework for the participants to share their results and experiences with the larger mathematical community;
- 4 To begin to provide the tools and knowledge necessary to become an independent, contributing member of the mathematical community;
- 5 To create a highly diverse and supportive environment where the participants learn to work and live with a wide variety of individuals;
- 6 To attempt to accurately measure the success or failure of this program through a wide variety of evaluative processes with the assistance of an experienced agency.

- Undergraduate students
- Abstract algebra
 - Linear algebra may suffice in exceptional cases.
- Citizens or permanent residents of the United States or its possessions
- Emphasis on students from small colleges and universities
- Encourage female, minority, and disabled students to apply

- NSF REU website
- Flyer at Joint Mathematics Meetings in January
- Mass emailings to mathematics departments
- Word of mouth (colleagues at other institutions)
- Website (<http://www.wabash.edu/academics/math/wsia>)

Application Process

- Application due 1 Mar
 - A letter of interest
 - A current undergraduate transcript
 - Two letters of recommendation
 - A document containing name, email, home address, college address, expected graduation date, a description of topics covered in Abstract Algebra course(s), and a list of honors and awards
 - Nonbinding research topic preference
- Review applications
 - Working in groups
 - Topic preference
- Invite candidates
 - Week to accept

- Applications

	Men	Women
2005	47 (69%)	21 (31%)
2006	69 (63%)	41 (37%)

- Participants

	Men	Women
2005	7 (58%)	5 (42%)
2006	8 [†] (62%)	5 (38%)

[†]Includes one international Wabash Student not funded by the NSF grant

Participants From...

- Agnes Scott College[†]
- Amherst College
- Anderson University
- Bryn Mawr College[†]
- Bucknell University
- California State University
- Carleton College
- Case Western Reserve University
- Emporia State University
- Harvey Mudd College
- Hastings College
- John Carroll University
- Kalamazoo College
- Lafayette College
- Lake Forest College
- Merrimack College
- Northwestern University
- University of Evansville
- University of Puerto Rico
- Wabash College[†]
- Youngstown State University

[†]Single-sex institution

- Driving
 - Met by one of the professors
- Flying
 - Arrangements through CAE
- Housed in two college-owned houses
 - Cook their own meals
- Temporary access to Allen Center, Library
- Access to WabNet (no email)

- First 2 – 3 weeks
- Introduce students to three research areas
 - Commutative Ring Theory (Axtell)
 - Automated Theorem Proving / Loop Theory (Phillips)
 - Symbolic Computation / Computer Algebra (Turner)
- Students give preferences at end
- We divide them into research teams

- David Neidorf
 - Vice President & Dean of the College, Deep Springs College
 - Director, Educational Programs, Bioethics-In-Action, Inc.
 - Formerly Director, Integrated Studies Program, Middlebury College
- Three Goals
 - 1 Provide promising students a significant and formative exposure to the interface between work in mathematics and ethics
 - 2 Ensure that participants are thoughtfully aware of their responsibilities as both professionals and citizens, and are alert to the tensions and conflicts between these two roles
 - 3 Empower the skillful discussion and resolution of concrete ethical problems through the examination of ethical case studies according to varying schema of conceptual evaluation

- Five instructional days
 - Mornings in ethics component
 - Afternoons starting on research
- Three parts
 - 1 Analysis of case studies and associated background reading
 - 2 Student presentation of independent analysis of new case studies
 - 3 Group discussion of the student presentations

Research!

- Last 5 – 6 weeks
 - Half time with ethics component 1 week
 - Full time remaining 4 – 5 weeks
- Work in small groups
- Supervised by professor

- Organized by professors
 - Dinner at each professor's house
 - Indianapolis Indians
 - Canoe trip
 - Hike at Shades State Park
- Student-initiated / Spontaneous
 - Meals, outings, etc.
 - Visit to University of Illinois

Outside Speakers

- Weekly lunch or afternoon talks
- Research talk – open to public
- More personal talk with participants about graduate school
- Question and answer session

- Mathematics Department Graduate Student Directors
 - Prof. Phillip Griffith, University of Illinois
 - Prof. David Manderscheid, University of Iowa
 - Prof. Julia Knight, University of Notre Dame
- Graduate Students
 - Dan Smith, Wabash '03 – Indiana University
 - Paige Rinker, WSIA '05 – Dartmouth College
- Others
 - Prof. Will Geller, Indiana University - Purdue University at Indianapolis
 - Prof. Reza Akhtar, Miami University
 - Prof. Carl Cowen, Indiana University - Purdue University at Indianapolis
 - President, Mathematical Association of America

Regular Reports

- Informal
- Weekly updates on research projects
- Include other students in department
- Practice for presentations

- Questionnaires throughout program
 - Introductory (base-line) questionnaire
 - Short activities every few weeks
 - Longer essay at end
- Categories of questions
 - Expectations versus reality
 - High / low points
 - Change in self-perception and confidence, understanding of mathematics research
 - Living environment
 - Ethics component
 - Lectures
 - Outside speakers
 - Research
 - Group work

Undergraduate Conferences

- Indiana REU Student Conference
 - Last Thursday in July
 - Bloomington, IN
 - Students give 15 minute talks
- Joint Mathematics Meetings
 - Early January
 - Joint meeting of mathematical societies
 - American Mathematical Society (AMS)
 - Mathematical Association of America (MAA)
 - Undergraduate poster session

- Students' Institutions
 - Wabash College Celebration of Student Research
 - Bucknell University
 - Kalamazoo College
 - University of Evansville Math Club
- Regional Undergraduate Conferences
 - Rose-Hulman Undergraduate Research Conference
 - University of Dayton Undergraduate Research Day

- All three groups (2005) wrote papers
- Undergraduate journals
E.g., American Journal of Undergraduate Research
- At least one accepted for publication