

# Developing a Student-Led Undergraduate Environmental Research Organization: The Society of Environmental Engineers and Scientists



MCLANE ENVIRONMENTAL, LLC

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LAFAYETTE

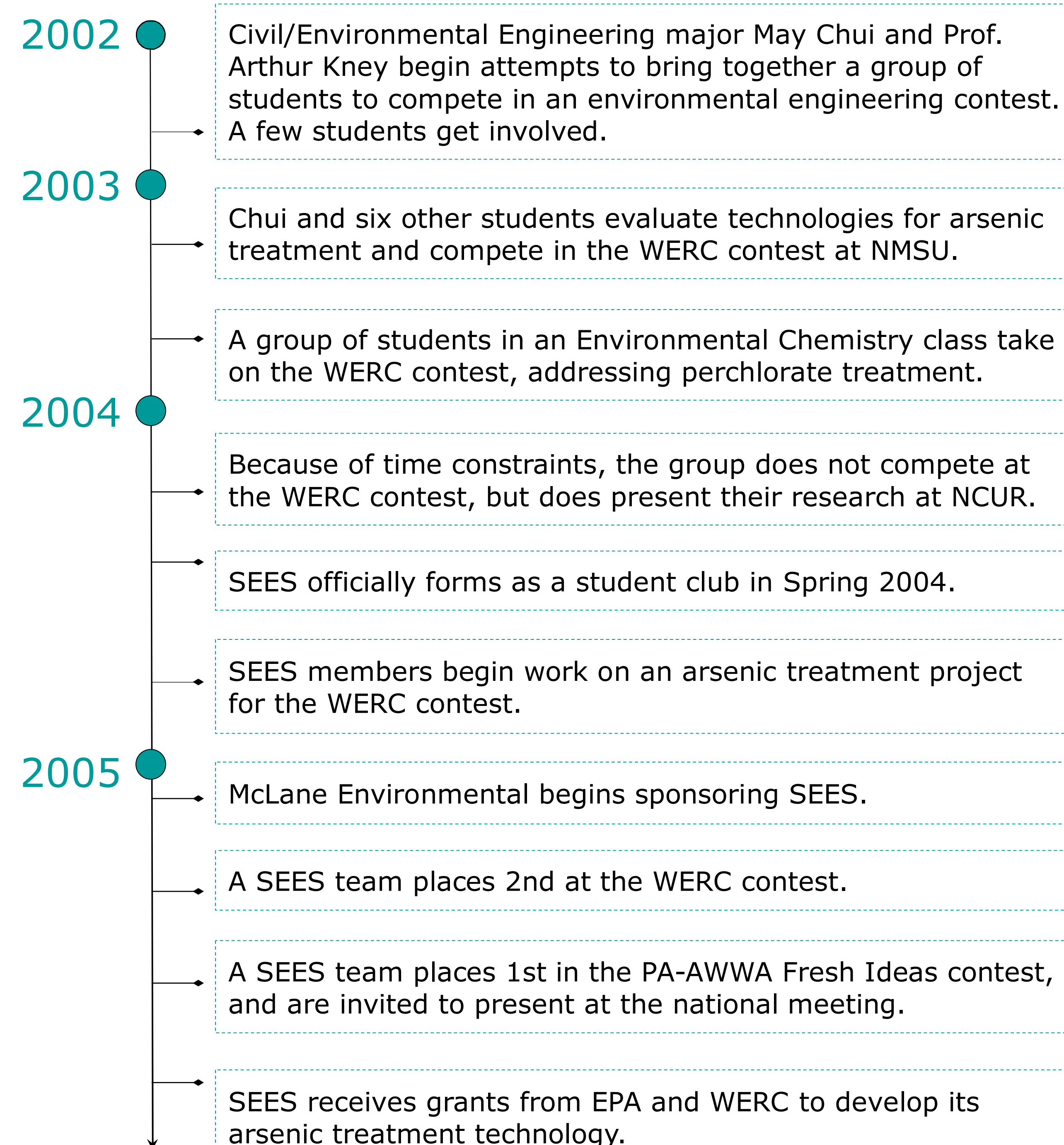


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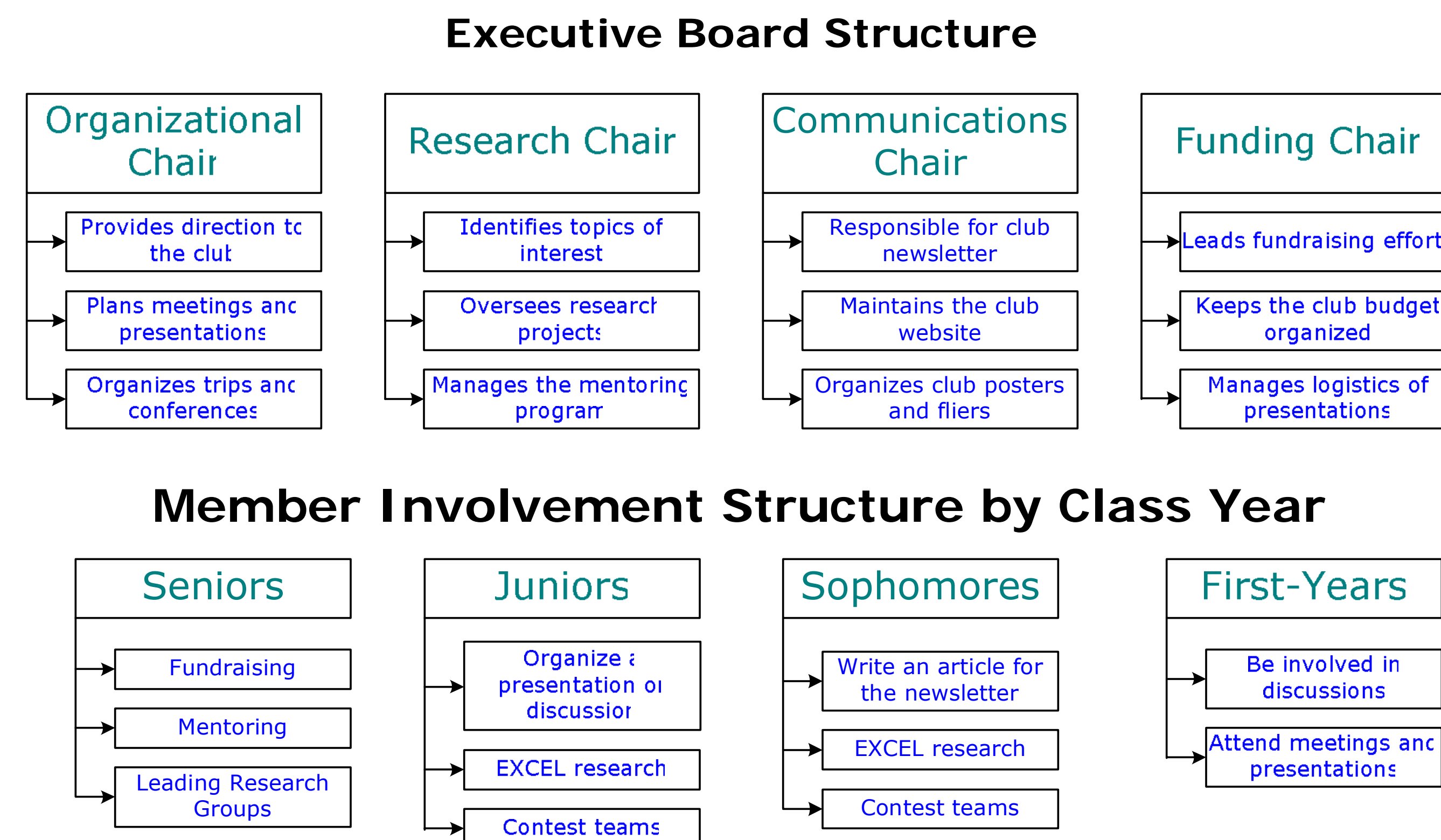
## Abstract

The objective of this poster is to provide insight into the formation and organization of the Society of Environmental Engineers and Scientists (SEES), an interdisciplinary student-formed and led group at Lafayette College. SEES was founded to provide a comprehensive experience in solving current environmental problems from a well-rounded, engineering-oriented perspective. The group facilitates the individual undergraduate research efforts of its members, offers opportunities for collaborative interdisciplinary research, fosters professional development and provides a forum for discussing issues associated with green chemistry, engineering and sustainability. Also presented are discussions of problems that the club has faced, including explanations of how these were addressed, and the benefits of SEES from a student perspective, with the hope that others will find the information useful in founding similar organizations.

## Club History

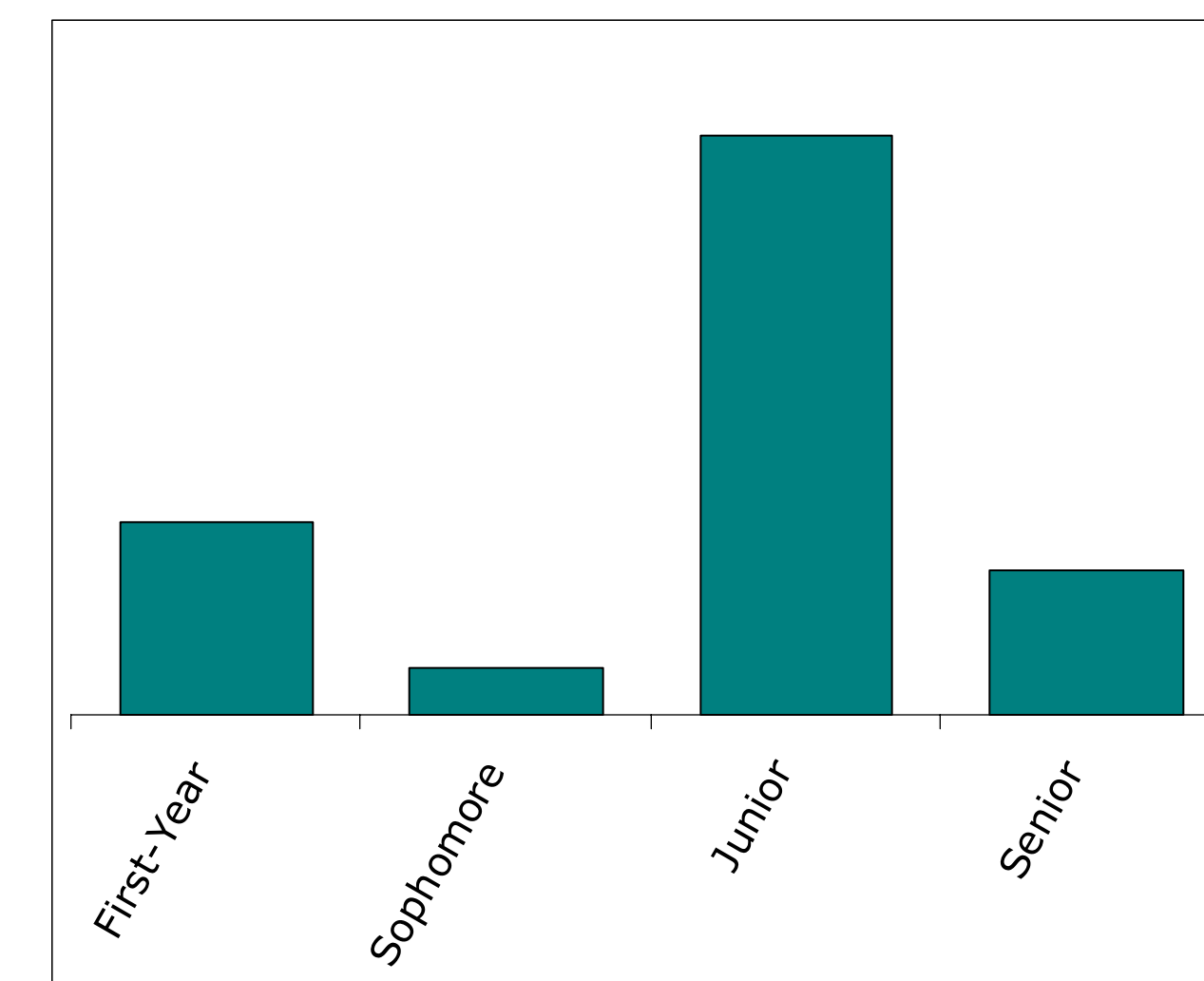


## Organizational Structure



## Issues Faced

Involving All Levels of the Student Body



What we've done to get more first-years and sophomores involved:

- ◆ Placing a booth at the campus Activities Fair
- ◆ Posting flyers around campus
- ◆ Soliciting professor recommendations of students
- ◆ Identifying issues of broad concern
- ◆ Organizing club recreational events

### Securing Sufficient Funding to Facilitate Research

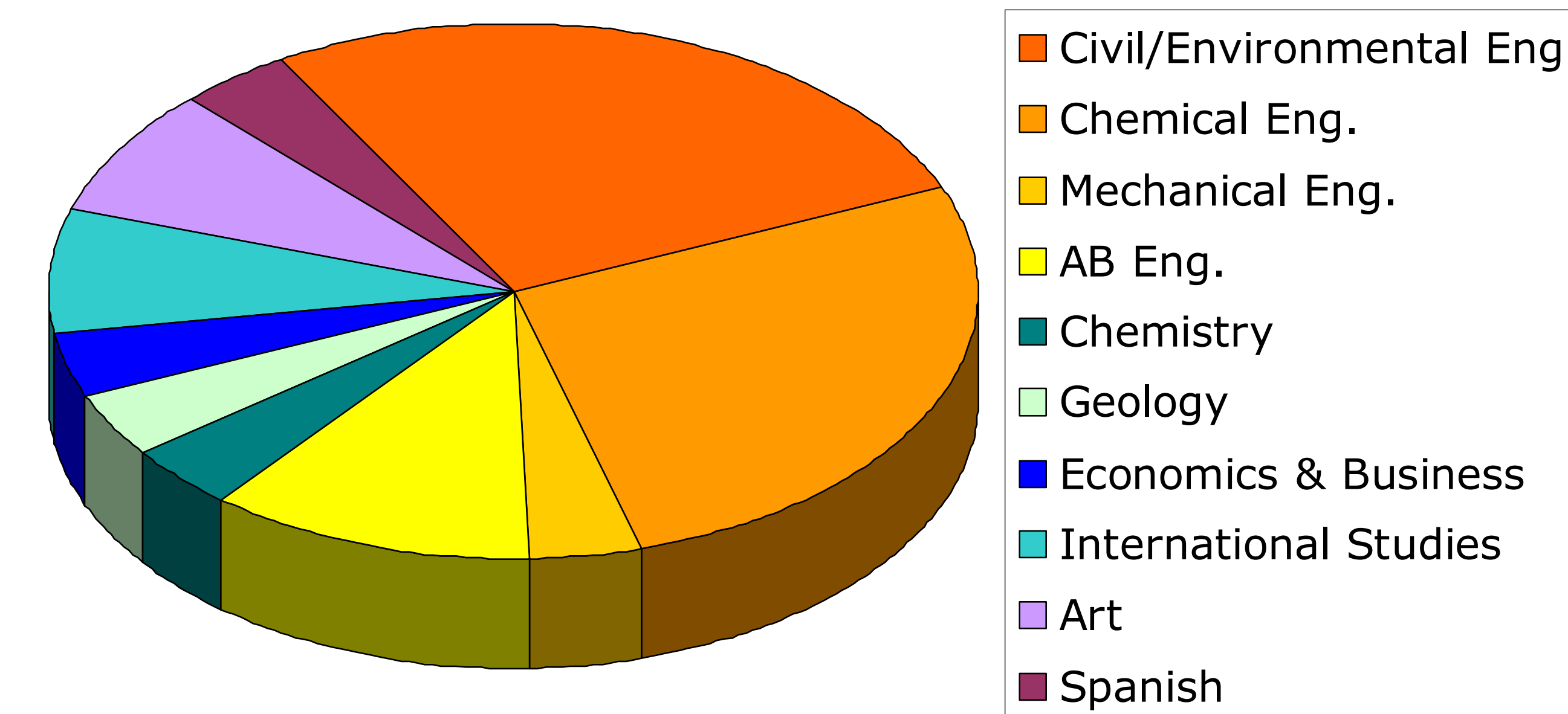
- ◆ Soliciting departmental funding
- ◆ Helping members prepare Lafayette College Student Initiated Research Grants
- ◆ Requesting money from Student Government for presentations
- ◆ Collaborating with local environmentally-related firms
  - This also provides internship opportunities for members

## Dealing with 'Science-Phobia'

How we've drawn people from outside engineering and chemistry:

- ◆ Selecting broad, multi-faceted projects
  - Allows non-science majors to effectively apply their knowledge base to scientific issues
  - Generates interest among non-science majors
- ◆ Emphasizing the importance of an interdisciplinary team
  - Explaining how other majors can contribute on posters and fliers
  - Cooperative problem solving and different majors teaching one-another adds interest and enhances the effectiveness of the interdisciplinary SEES research teams
- ◆ Actively soliciting involvement from students in other departments

The success of these efforts can be seen in the broad range in the majors of SEES members:



## Enhancing Learning

- ◆ SEES works cooperatively with the science and engineering curriculum to provide structure for research projects as well as facilitating the application of classroom knowledge.
- ◆ At this point relationships have been formed with the following classes:
  - Environmental Engineering Design
  - Environmental Chemistry
  - Senior Chemical Engineering Design
- ◆ Relationships are currently being developed with the following disciplines:
  - Biology & Biochemistry
  - Geology
  - Government & Law
  - Economics & Business

## Benefits to Students

### Opportunities for Undergraduate Research

SEES has facilitated and organized research in the following areas:

- ◆ Arsenic treatment in drinking water
- ◆ XAFS analysis of complexed metal hydroxide surface structures
- ◆ Applying Polymeric Ligand Exchange to perchlorate treatment
- ◆ Fate of airborne sulfur dioxide
- ◆ Zinc uptake by ferric hydroxide layers in wetland systems

### Grant-Writing Experience

In the past year, SEES members have lead and been involved in the writing of five grant proposals, an invaluable experience for graduate school-track students.

- ◆ EPA P<sup>3</sup> – \$25,746 (Arsenic Well-Head Unit)
- ◆ WERC/NMSU—\$27,000 (Arsenic RSSCT & Kinetics)
- ◆ Lafayette Student Research Grant—\$400 (Arsenic)
- ◆ Lafayette Student Research Grant—\$800 (Perchlorate)
- ◆ Lafayette Student Research Grant—\$300 (Sulfur Dioxide)

### Conference Presentation Experience

SEES has provided its members with experience presenting at the following conferences:

- ◆ 2004 National Conference for Undergraduate Research
- ◆ 2004 National AIChE Student Conference
- ◆ 2005 National Conference on Undergraduate Research
- ◆ 2005 Northeast Bioengineering Conference
- ◆ 2005 Mid-Atlantic Regional Student AIChE Conference
- ◆ 2005 Spring National AIChE Conference
- ◆ 2005 PA-AWWA Spring Meeting
- ◆ 2005 ACS Colloid and Surface Symposium
- ◆ 2005 AWWA Annual Conference and Exposition

Research by members of SEES will be presented at the following upcoming conferences:

- ◆ 2005 ACS National Meeting
- ◆ 2005 Fall National AIChE Conference
- ◆ 14<sup>th</sup> Symposium on Separations Science and Technology for Energy Applications
- ◆ First International Congress on Science and Technology, Research Center of the Polytechnic School of the Army, Quito, Ecuador

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