Linking Research, Education, and Professional Skills: Vertically Integrated Projects (VIP) at Four Institutions

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Goal: Uniting Scholarship & Exploration

Scholarship and Exploration

• Scholarship/Education: Development of Deep Knowledge and Expertise in One or More Fields
• Exploration/Research: Acts of Discovery, Design, Creativity, Innovation, etc. ... in One or More Fields
Barriers:
Three Forms of Academic Fragmentation

Fragmentation by Time
Undergraduates’ Experiences Confined to Semesters, Academic Years

Fragmentation By Mission
Academic Staff Activities Partitioned into Exploration / Scholarship / Outreach

Fragmentation By Discipline
Budget Lines and “Cultures” that Create and Reinforce Disciplinary Silos
Overcoming Barriers: The VIP Approach

Enable Continuity of Time
For-Credit, Vertically Integrated Projects that Span Students’ Time to Degree

Integrate Missions
VIP Teams Embedded in the Research Activities of Academic Staff

Breach Disciplinary Silos
VIP Teams Focus on Ambitious Projects Spanning Multiple Disciplines
VIP Program Architecture:

Enable Long-Term, Large-Scale, Multidisciplinary Teams

- Project teams: Requested by Academic Staff
- Large teams: 10-20+ undergraduates; 1-4 grad students
- 2nd through final year undergraduates on every team
- New students replace those who graduate
- Long-term participation – up to 3 years per student
- Teams continue for many years, even decades
- Students drawn from all disciplines needed by the project
- Academic credit and grades each semester
2015 Members of a 20-year-old VIP Team
Georgia Tech VIP Programme: Spr. 2020

• 81 Teams; 1300 Undergraduates Enrolled
• Students and Academic Staff from all GT Colleges: Business, Computing, Design, Engineering, Liberal Arts, and Science
• List of GT VIP teams: Descriptions includes Goals and List of Desired Disciplines:

http://www.vip.gatech.edu/teams
VIP Team Size & Majors: Spring 2020
VIP Instructors by Department, Spring 2020

- **Engineering**
  - Electrical & Computer Engineering
  - Mechanical Engineering
- **Sciences**
  - Biology
  - Physics
  - Chemistry
  - Earth and Atmospheric Sciences
  - Psychology
- **Computing**
  - Computing
  - Interactive Media Design
  - Comp Science
- **Design**
  - Design
- **Liberal Arts**
  - Literature and Media Communication
  - Modern Languages
  - Public Policy
  - History
- **Others**
  - G2U
  - Library
  - Professional Development
  - Ho...
Assessing the Performance of VIP Students

• Assessment Process: Middle + End of Each Semester
  • Every Student Graded: A, B, C, D, F
  • No P/F, No Auditing, No Volunteers

• Peer Evaluations – Tuned for VIP’s Large Teams

• Three Components in Assessment:
  • **Documentation**: Journals, Wiki, GitHub, Reports, ...
  • **Individual Contributions**: Judged by Team’s Advisers
  • **Teamwork**: Advisers’ Observations plus Peer Evaluations
VIP: Primary Benefits

For Students:

- Long-term Team Experience Focused on a Real Project
- Opportunity to Learn/Master different Roles/Skills
- In-Depth Experience in their Field
- Long-term Multi-Disciplinary Experience

For Academic Staff:

- Better Organized, More Effective UG Research
- Continuity of Knowledge and Experience on Team
- Peer-to-Peer Mentoring and Onboarding by Students
The VIP Programme Characteristics

- Led by Academic Staff
- Projects embedded in Research of Academic Staff
- Large-Scale Projects Lasting Years/Decades
- Multidisciplinary Teams Possible/Encouraged
- Program is Curricular; All Students Graded
- Incentives for Students to Participate for 2+ Years
- Outcomes = Disciplinary + Professional Skills
The VIP Consortium: 41 Members, So Far.....

International (15):
- Inha University (Korea)
- Malmö University (Sweden)
- Natn’l Dong Hwa Univ. (Taiwan)
- Natn’l Ilan University (Taiwan)
- Natn’l Taiwan University (Taiwan)
- Riga Technical University (Latvia)
- Universidad de Chile (Chile)
- Universidad del Norte (Colombia)
- Universidad ICESI (Colombia)
- Universidad Mayor (Chile)
- Univ. of New South Wales (Austral.)
- Univ. of Pretoria (South Africa)
- Univ. of St Andrews (Scotland)

Univ of Strathclyde (Scotland)
- UNICAMP (Brazil)

United States (26):
- Arizona State University
- Boise State University
- Colorado State University
- Cooper Union
- Drexel University
- Georgia State University
- Georgia Tech
- Howard University
- Iowa State University
- Morehouse College
- New York University

- Notre Dame
- Polytechnic Univ. of Puerto Rico
- Purdue University
- Rice University
- Stony Brook University
- Texas A&M University
- UC Davis
- University of Arizona
- University of Delaware
- University of Georgia
- University of Hawaii
- University of Michigan
- University of Washington
- VA Commonwealth University
- Virginia Tech
The VIP Consortium: 2019 Annual Meeting
for Sustainable Development

1. No Poverty
2. Zero Hunger
3. Good Health and Well-Being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals
VIP Africa Dimension: Climate Justice Fund IWRM Research Malawi

The University of Strathclyde Climate Justice Fund: Water Futures Programme aims to be a transformational step supporting the Ministry of Agriculture, Irrigation and Water Development to evaluate rural water supplies in 8 districts in the Lower Shire Malawi (25% of Malawi).

VIP Consortium
VIP4SD currently has:

- 19 multidisciplinary projects operating across all four faculties
- Between 150-200 students per year
- 10 projects conducting outreach, locally and internationally
Further European VIP sites

- University of Malmö, Sweden
  - Commenced 2018, Cross Faculty
  - 5 Teams, 50 students, Technology, Culture Society

- Riga Technical University, Latvia
  - 7 Teams, 140 students, Technology, Space, Sensors

- University of St. Andrews, Scotland, UK
  - Commenced 2020-21, 8 projects, 60 students
  - First program based mainly in Humanities
What could you achieve if you had a VIP Team?
### VIP Course Structure: Campus-wide Courses
Available in all Disciplines

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- Each course can be taken multiple times
- Each *team* is one section of *every* course