NYU VIP Program

Vertically Integrated Projects
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Vertically Integrated Projects

Systemic reform of higher education

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About VIP
“The development of novel products, services, and processes for the benefit of society”
(Too Narrow!)

“Inspiration plus Execution”
(Works in all Disciplines!)
University Barriers: The 3 Forms of Fragmentation

Fragmentation of Mission

Innovation/Research: *Discovery, Design, Creativity, ….*

Education: *Pass on Knowledge, Skills, Ways of Thinking*

Service: *Create Partnerships, Enable Economic Development*

Fragmentation of Time

Semesters

Academic Years

Fragmentation by Discipline

Scholarship, “The Thinkings”

Budget Lines, Cultures
Foster Innovation by Involving Students in Challenging Projects Embedded in Faculty Research/Innovation

Ensure Success by Providing:

- Time
- Context
- Mentoring
Students need real projects in which they experience the innovation process.

Researchers can benefit from help at all levels of the innovation process.
Enable Long-Term, Large-Scale, Multidisciplinary Teams

**Structural:**
- Projects led by researchers; embedded in their research
- Large teams: 10-40+ undergraduates; 1-4 grad students
- Academic credit and a grade each semester
- Teams/Projects continue for years, decades

**Students:**
- Students drawn from all disciplines needed by the project
- 1st year through 4th year students on every team
- Long-term participation – up to 3 years per UG student
- New students replace those who graduate
VIP Benefits for Students

- Realistic Team Experience
- Opportunity to Learn/Master different Roles/Skills
- In-Depth Experience in their Field
- Long-term Multi-Disciplinary Experience
- Knowledge Exchange across many Boundaries
- Provide a Compelling Reason to be on Campus
- Preparation for Work / Grad School
- Understanding of the Innovation Process
VIP Benefits for Faculty

- Better Organized, More Effective UG Research
  - Peer Leadership and Management Reduces Workload
  - Provides Structure for Grading, Feedback, and Documentation
  - Continuity of Knowledge and Experience on Team

- Adds New Dimension to Research Capability
  - Education & Broader Impact Sections of Grants

- Enthusiastic Minds and Hands

- Recruiting for Graduate School
VIP Program: Essential Characteristics

- VIP Program Led by Faculty
- Projects embedded in Professors’ Research Efforts
- Large-Scale Projects Lasting Years/Decades
- Multidisciplinary Teams Possible/Encouraged
- Program is Curricular; All Students Graded
- Incentives for Students to Participate for 2+ Years
- Classroom and Meeting Space Supporting Teams
- Learning Outcomes: Disciplinary and Professional Skills
VIP at NYU
Process for Creating a VIP

1. Faculty Idea
2. Contact VIP Directors
3. Recruit
4. Professional Organization Structure

Start-Up Teams
- Faculty
- Subteam Leaders
- Members

Established Teams
- Faculty
- Subteam Leaders
- Members
VIP Team Recruitment

- Info sessions, social media, emails, website, applications

3D Printed Biomedical Devices
- Info Sheet
- Application

Concrete Canoe
- Info Sheet
- Application

INTERCEP
- Info Sheet
- Application

Mixed Reality Engineering Lab
- Info Sheet
- Application

Music Experience Design Lab
- Info Sheet
- Application

NYU Hyperloop
- Info Sheet
- Application

vip.engineering.nyu.edu
NYU Survey (Qualtrics) Applications

- Name, contact, year, major, statement, resume
VIP Notebook

Notebook template, rubric, and peer evals provided

Jack Ringardner
VIP Smart Cities Technology
Sub-team name (Cities, Vehicles, Infrastructure, Transportation Users)
Week of 9/4/2017

Meeting Notes
- Brainstorming survey questions for shared autonomous vehicle users
- Design considerations for smart electric vehicles charging stations
- Etc.

Resources
- United States Department of Transportation (USDOT) is considering requiring vehicle to vehicle communication capabilities for all newly manufactured cars
- Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) has the potential to reduce non-distracted driving crashes by 80%
- Etc.

Tasks Completed
- Wrote first draft of survey questions to bring to the sub-team meeting to discuss
- Put together a budget for potential sensors that would be worth testing
- Etc.

VIP Notebook Grading Rubric

<table>
<thead>
<tr>
<th>Student Name</th>
<th>VIP Team</th>
<th>Semester</th>
</tr>
</thead>
</table>

**Notebook Maintenance (15)**
- Notebook format, name and info included: 0 Poor, 1 Intermediate, 2 Exemplary
- Regularly updated: 0 Poor, 1 Intermediate, 2 Exemplary
- Neatness, easy to follow: 0 Poor, 1 Intermediate, 2 Exemplary

<table>
<thead>
<tr>
<th>Meeting notes (15)</th>
<th>Non-existent, disorganized</th>
<th>Present and clear, but short</th>
<th>Detailed notes, includes sub-group meetings and mid-week exchanges</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Resources and tasks completed (35)</th>
<th>Resources fully sized and easy to find</th>
<th>Completed tasks documented with technical detail</th>
<th>Products included when relevant (drawings, codes, charts, budget, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To-do items listed and checked</td>
<td>0 Poor, 1 Intermediate, 2 Exemplary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Usability (35)</th>
<th>Organization</th>
<th>Personal work and accomplishments well recorded</th>
<th>Poorly documented: Someone familiar with the field would not be able to follow the directions made or work completed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Useful resource</td>
<td>Poor resource or reference for the team.</td>
<td>Useful resource: Someone familiar with the project would find sufficient answers.</td>
<td>Exemplary: In addition to bringing well documented, includes explanations, justifications and reflections.</td>
</tr>
</tbody>
</table>

Total out of 100:

Comments:
Based on project notebook, performance, peer evals

<table>
<thead>
<tr>
<th>Item</th>
<th>Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation and records (VIP Notebook)</td>
<td>30%</td>
</tr>
<tr>
<td>Personal accomplishments and contributions to your team’s goals</td>
<td>30%</td>
</tr>
<tr>
<td>Teamwork and interaction</td>
<td>30%</td>
</tr>
<tr>
<td>End of Semester Presentation or Report</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
VIP Advantages
VIP is International

NYU | ABU DHABI

"ourke"
VIP Program Advantages

- Scalable, sustainable, and accessible
- Credit bearing + counts toward degrees:
  - Enables all students to participate
- Joining teams:
  - No interviews, No GPA requirements, No Prerequisites
- Unique among High-Impact programs:
  - %URMs in Georgia Tech VIP = % in overall student population
- High Participation amongst Transfer Students
1. Improving Graduation Rates, Learning Outcomes, and Equity in Higher Education
   - VIP offers a cost-effective, scalable and sustainable model for making high-impact undergraduate research experiences available to all students in every discipline
2. Accelerating the Pace of Innovation to Solve Increasingly Complex Problems
3. Improving Student Preparedness for an Increasingly Diverse Workforce
**VIP Consortium**

**Domestic**
- Arizona State University
- Boise State University
- Colorado State University
- Drexel University
- Florida International University
- Georgia Tech
- Howard University
- Morehouse College
- New York University
- Purdue University
- Rice University
- Stony Brook
- Texas A&M University
- UC Davis

**University of Delaware**
**University of Georgia**
**University of Hawaii**
**University of Michigan**
**University of Washington**
**VA Commonwealth University**
**Virginia Tech**

**International**
- Natn’l Dong Hwa University
- Natn’l Ilan University
- Universidad del Norte
- Riga Technical University
- Inha Univ.
- Malmö University
- University of Pretoria
- University of Strathclyde

**Pending**
- Georgia State University
- Iowa State
- NCA&T
- Notre Dame
- Tuskegee University
- UC Riverside

*AAU: Member Institution*
*URM: Underrepresented Minority Institution*

1: Program in place prior to Consortium establishment

**Bold: Georgia Institutions**
VIP Mid-Atlantic Conference Dec 7th

“...The next revolution in higher education research...”

Drexel University
Howard University
NYU
Stony Brook University
University of Delaware
VCU
Virginia Tech
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NYU Tandon School of Engineering