Photos in Living Color

- Purdue University iGEM Team
Purdue University - iGEM

- Team Advisor: Jenna L. Rickus, Ph.D.
  Assistant Professor - Dept. of Agricultural & Biological Engineering & Weldon School of Biomedical Engineering

- Project Leader: John Schumm
  Junior in Agricultural and Biological Engineering

- Graduate Supervisor: John Koehler
  Master's in Agricultural & Biological Engineering

- Aaron Young
  Sophomore in Biomedical Engineering

- Piyush Bajaj
  Senior in Biomedical Engineering
Acknowledgements

- Agricultural and Biological Engineering
- Purdue Resources in Engineering
- Prof. Jenna Rickus
- Prof. Kari Clase
- Prof. Nathan Mosier
- Bindley Bioscience Center
- Purdue Laboratory of Renewable Resources in Engineering
History
Founded in 1869 and named after benefactor John Purdue, Purdue University began its journey with six instructors, 39 students and a mission to provide agriculture and mechanic arts education.

Student Body
West Lafayette enrollment of 38,712 students (fall 2005); students from 50 states and 130 countries.

Purdue University enjoys global renown for its world-class instructional and research pursuits.
iGEM & Purdue

- As one of the largest universities in the nation, Purdue is acclaimed for the quality of its teaching and research in a wide range of fields.

- Participating for the first time in the iGEM competition.

- Formation of a student organization titled Biological Engineering in Genetics.
In the Beginning...

- BEG is a completely student run organization and an officially recognized Purdue club.
- To gain such status, a constitution was written to govern the club.
  - This included officer elections, lab safety, and other foreseeable issues.
  - Completed and submitted to Purdue for approval and status.
- Makes Purdue BEG unique and appealing to donors as it is student run and directed.
Did Somebody say Money?

- Fundraising conducted within school departments to pay for research, travel, and other associated costs.

- Packet of information developed and distributed during sales pitch.
  - Samples of used material will be available on the BEG website for future reference by other schools.

- Referencing student basis, students have control of funds but cannot create expenditures without approval of Advisor and Treasurer.
The Idea

Fluorescent Biological Photo Paper

Use ink Jet printer to apply repressors/inducers to sheet of paper.

Incubate Paper with Genetically Modified e-coli that express fluorescent colors in presence of these repressors/inducers.
Part Priorities

- **Use water soluble molecules.**
  - IPTG and tetR
- **Use an antibiotic to kill e-coli in white space.**
  - Kanamycin
- **Signal for strong colored fluorescent proteins**
  - GFP, mRFP
Part Selection

- Three Parts used
  - GFP BBa_l13521
  - RFP BBa_j04430
  - tetR Plasmid
Part Creation - Standard Assembly

[Diagram showing a process flow with labeled parts and enzymes: E, X, S, P, AMP, TET, with steps labeled as Cut with E & S, Mix & Ligate.]

The Process

- Prepared Competent Cells
- Transformation of DNA
- Miniprep
- Enzyme Digest
- Gel Electrophoresis
- Gel Extraction
- Ligation
- Repeat
Printer Problems

- Loading Problems
- Ink/ Promoter Viscosity
- Diffusion throughout the paper

Printer Solutions

- Find an easily refillable printer
- Print trial with table sugar
Biological Problems

- Bacteria Growing on Paper
  - Will it stay in one place?
- Diffusion of Promoters in media
- Resolution of GFP mRFP
Future Plans

- Recruit full time student research over the summer
  - 3-5 Students
  - Use the Purdue SURF program
- Expand into other engineering disciplines
iGEM plans

- Keep the project student run
  - Allow the next generation of students to pick their project
  - Encourage members with little experience to join
- Obtain dedicated lab space and equipment
Funding

- Need a reliable source of annual funding
  - Lab equipment, trips, summer students
  - Goal is an endowment through Discovery Park
Questions