ALPhA's Laboratory Immersions Program – Bringing BFY Back Home

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Overview

• Immersion Idea / Goals
• 2010, 2011, 2012 Immersions
• Impact so far
• Future Immersions
• Feedback needed
Genesis of the Immersion Idea

- 2009 AAPT Topical Conference on Advanced Laboratories
- Instructors isolated, teaching ‘out of their area’
- Small group of instructors impact a large fraction of physics students
Program Goals

• Develop instructional expertise using a mentorship model
  – 1 experienced mentor, few participants
  – 2-3 participants per experimental setup
  – 2-3 day, immersive, hands-on
  – Leave knowing experiment well enough to teach it with confidence
What ALPhA Offers to Each Site

- Planning checklists
- Advertising
- Online Registration
- Participant Surveys
- Support for Participant Meals (registration)
- Mentor stipends (in 2011 with NSF support)
- Support for needed supplies

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What Sites/Mentors must do

• Prepare experiment descriptions
• Arrange housing options
• Arrange meals
• Prepare, send, and provide feedback on participant ‘homework’
• Provide intensive support during Immersion
• Provide follow-up support as needed
What Participants Must Do

• Pay registration fee
• Arrange and pay for travel to site and housing
• Complete pre-Immersion homework
• Get a great, in-depth experience
• Take part in follow-up surveys
Outline of events at Immersion

- Initial gathering and discussion
- Begin experiment
- Continue experiment
- Complete experiment
- Wrap-up discussion, presentations
- Exit survey
2010 Immersions Sites

• Buffalo State College (12 participants, 3 days)
  – Pulsed NMR, Optical pumping, Modern interferometry, Mossbauer spectroscopy, High – $T_C$ superconductivity

• Caltech (12 participants, 3 days)
  – Vacuum tech./Thin films, Low-noise signal detection, Saturated absorp. spect., Resonant absorption

• Dickinson College (12 participants, 2 days)
  – Single photon quantum mechanics

• Reed College (16 participants, 1 day) (AAPT workshop)
  – LabView instruction for the advanced lab
2011 Immersion Sites

• Buffalo State College (12 participants, 3 days)
  – Pulsed NMR, Optical pumping, Modern interferometry, Mossbauer spectroscopy, High – $T_C$ superconductivity

• Caltech (12 participants, 3 days)
  – Vacuum tech./Thin films, Low-noise signal detection, Spectroscopy of Rb atoms, Fabry-Perot cavities/laser stabilization

• Reed College (10 participants, 2 days)
  – LabView instruction for the advanced lab

• Colgate University (6 participants, 2.5 days)
  – Single photon and bi-photon experiments

• University of Rochester (6 participants, 2.5 days)
  – Single photon sources, entanglement, and Bell’s Inequalities

• Bethel University (11 participants, 3 days)
  – Imaging shock waves, External cavity lasers, Laser wavelength meter, Holographic measurements

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2012 Immersion Offerings

• University of Chicago (3 participants, 2 days, January 2012)
  – Single photon quantum mechanics experiments

• Whitman College (5 participants, 2.5 days)
  – Single photon quantum mechanics experiments

• Colgate University (6 participants, 2.5 days)
  – Single photon quantum mechanics experiments

“It was the best physics workshop that I have attended in recent memory.” - Immersion participant
Assessment

• Program assessment
  – Participant surveys to learn:
    • Quality of experience
    • Program impact (students, implementation)
    • Barriers to implementation
  – Assessing student learning *(Coming soon!)*
    • Single photon quantum mechanics experiments

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Follow-up Survey Results

Did you have enough knowledge and experience to implement the experiment at your own institution?

So far, >350 students impacted by 2010, 2011 Immersions
Implementation

2010 Immersions, 1.5 years later
22 out of 51: have implemented some portion
12: likely to implement in the near future

2011 Immersions, 6 months later
19 out of 55: have implemented some portion
24: likely to implement in the near future
Comparing the time required to implement the Immersion experiment to the amount of time available:

**Time required**

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**Time available**

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Comparing the money required to implement the Immersion experiment to the amount of money available:

![Bar chart showing the comparison between money required and money available for different budget ranges.](www.advlab.org)
Highly Recommended

- 75 out of 76 respondents would both recommend an Immersion to a colleague, and attend another in the future.

“It is such an efficient way to update your curriculum that it's a no-brainer.” - Immersion participant
2013 and Beyond

• Ramping up - Thanks to NSF support
  – 2013 at least 15 mentors
  – 2014 at least 21 mentors
  – 2015 at least 27 mentors

• Continue Assessment
Being a Mentor

• Disseminating the transformative undergraduate experiments you’ve developed

• Helping others learn to effectively teach using commercial apparatus

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Future Immersion Topics

• *You* tell us!
  – BFY/Immersion Survey  
    (Short - only 16 questions)
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DUE – 1122993

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Why so varied?

- Two sites using original model
- Reed (AAPT workshop)
- Dickinson College (NSF CCLI grant-supported workshop)
2010 Follow-up Survey Results

- Survey Administered – Spring 2011
  ~ 6 months after Immersions

- 38 of the 51 participants responded - 75% return rate

- 16 had implemented a part of the experiment
  ALL of the remaining 22 planned to implement experiments

- 100% would recommend the Immersions to a colleague

- 100% would participate in a future Immersion