

Purdue NExT™

Your Expertise: Evolved

Steve Dunlop - Managing Director

Basic Questions

- What is **Immersive Learning** ?
- Can powerful computing capability connected to the internet enable **immersive learning** ?
- Will individual student tracking of performance improve **immersive learning** ?
- How to improve the user interface for online learning

Background

- Purdue NExT had its origins in HUBzero™ (funded by NSF)
- Funding from the Provost's office, to create non-credit courses with faculty across Purdue
- Organized as an independent initiative with finances run through PEC
- Dual use of Hubzero technology –
 - tools and tool development
 - learning management system

Purdue NExT

- Non-credit badges
- Unique Academic Business Model
 - Revenues net of costs returned to faculty research centers and academic units
- Engaging other Purdue developed software – Passport, etc

Focus on Immersion

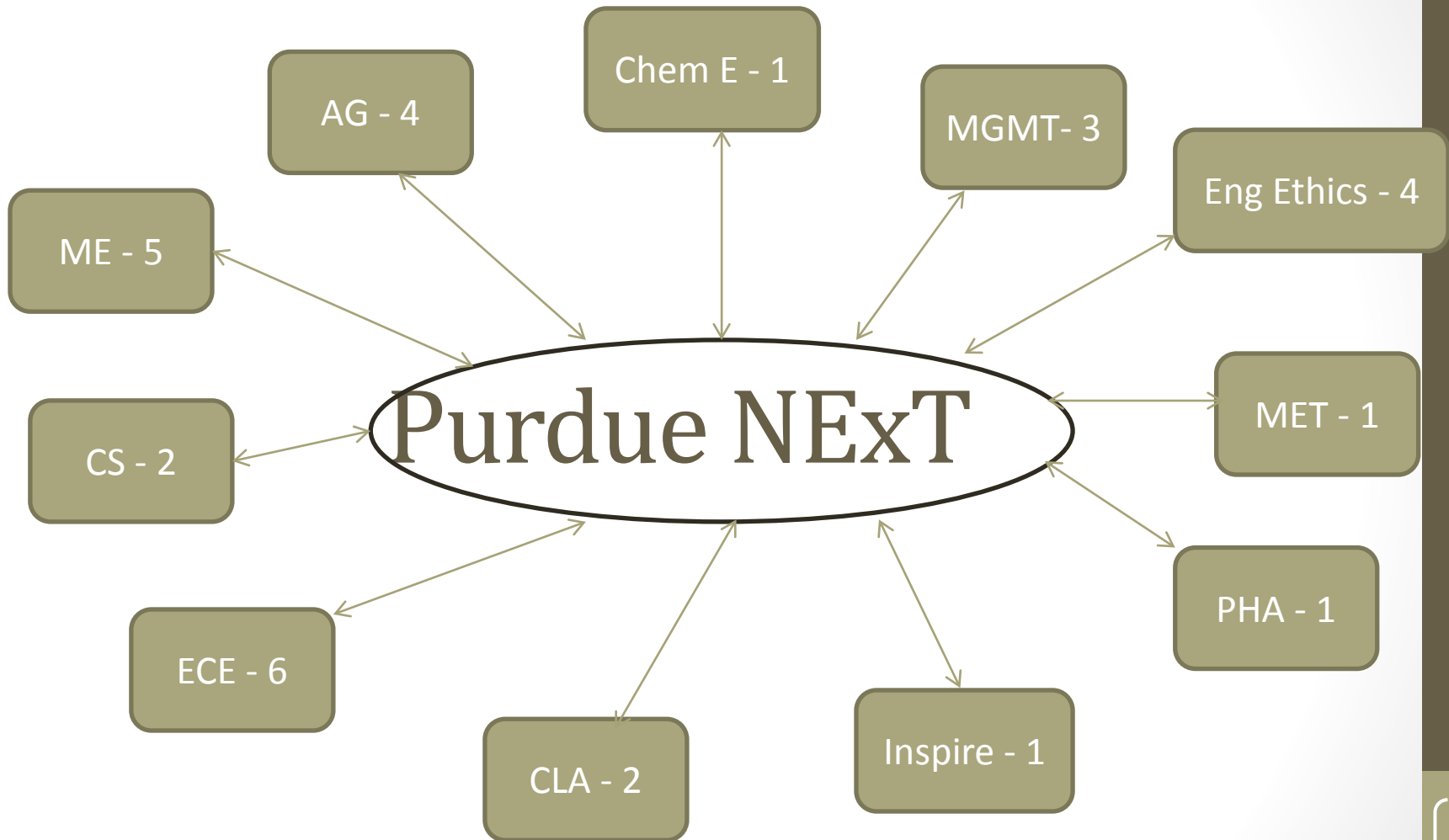
Faculty have focused on engaging students using

- Real world motivating examples
- Computer Simulations
- Interaction
- Real Data sets
- Visualizations
- Animation
- New tools to enhance learning

Current Course/Faculty Status and projections

- 30 faculty, across schools, are engaged actively in course development or specific course discussions
- 46 courses are targeted for release between August 2013 and May 2014
- Target markets vary from US, international, educational and corporate customers. Likely match for each course set to market may be different.
- Purdue West Lafayette Campus – Free, extension of current course offering

Purdue NExT- engaged with 30 faculty across academic units



Example course modules available for review

1. VLSI and Circuit Design – faculty introduction, close captioned, slides, transcript, interaction, SPICE, Cadence example (leakage in stacked transistors), PETE, Quiz, Exam
2. Lean Supply Chain Proficiency – faculty lecture, Exercise introduction, Pig Exercise
3. Optimization Modeling of Economic Systems – GAMS optimization and quiz
4. Dynamics – Kinematics – Working model simulation
5. Fundamentals of Nanoelectronics - Octave
6. Thermal Energy at Nanoscale – Mathematic CDF
7. Complex System Presentation tools
8. Hybrid Electric Vehicles
9. Global Sustainability

Purdue NExT Architecture

- **Topic Certificate** (requires a series of courses/badges to be completed)
- **Course** – certificate/badge – consists of **modules**
- **Modules** in a course will have **components**
 1. **Lectures** (close captioned), slides, transcript
 2. **Direct interaction** with lecture videos via captioning
 3. **Activities** – Hands - on
 4. **Homework** - monitored
 5. **Exam** – time stamped
 6. **Resources** (Link to research/teaching community), Discussion Boards

KEY: Interactive Simulations to understand concepts tested in the exams and exercises

Purdue NExT – Introduction

HOME ABOUT

NEED HELP?

PURDUENEXT LEARNING EXPERIENCE

☰ Course catalog

PURDUE
NExT.

This is an advanced VLSI Course for graduate students. High performance and low-power design issues in modern and future processors will be discussed in detail. There will be a project associated with the course.

Offering: Summer 2013 Alpha

Section: Default

Enroll in course

Overview Offerings

PURDUE
NExT™

About the Instructor

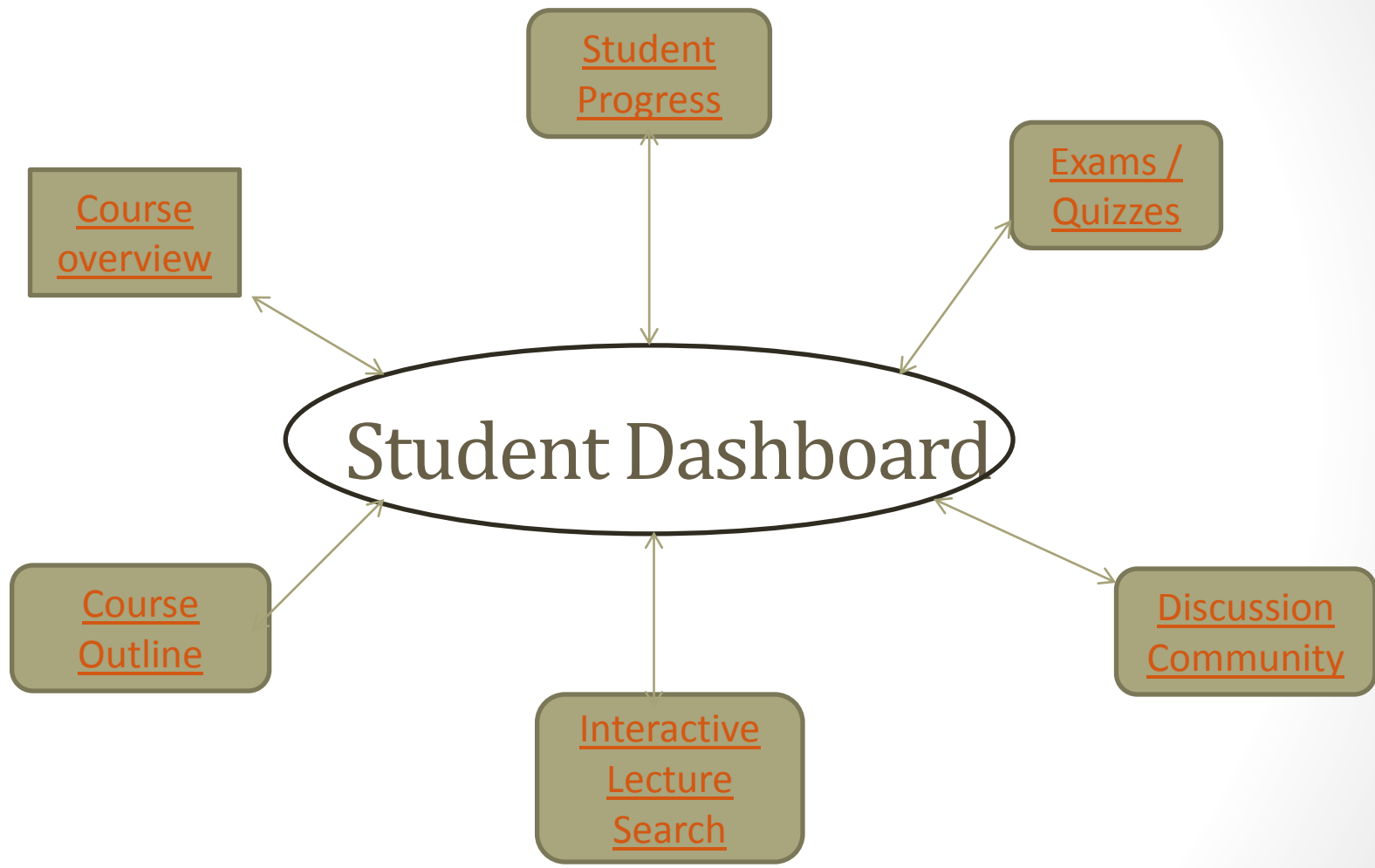


Kaushik Roy
Purdue University

Kaushik Roy received B.Tech. degree in electronics and electrical communications engineering from the Indian Institute of Technology, Kharagpur, India, and Ph.D. degree from the electrical and... [more](#)



Purdue NExT Delivery System



Purdue NExT – Module layout

The screenshot displays the Purdue NExT module layout for "VLSI AND CIRCUIT DESIGN". The interface features a dark blue sidebar on the left with icons for a signal strength indicator, a document with a notification badge (3), a megaphone with a notification badge (1), a speech bubble with a notification badge (3), and a pencil icon. The main content area is divided into several sections:

- VLSI AND CIRCUIT DESIGN** (Header)
- Lectures**
 - Transistors and the Basic Components of Leakage
 - [Lecture Video](#)
 - [Lecture Slides](#)
 - [Lecture Transcript](#)
 - MOSFET Parameters
 - [Lecture Video](#)
 - [Lecture Slides](#)
 - [Lecture Transcript](#)
- Resources**
 - Additional Web Resources
 - [Important Scientific Paper on Leakage by Prof. Roy](#)
 - Cadence
 - [Cadence Tool Tutorial](#)
- Activities**
 - PETE User Manual
 - [PETE Manual](#)
 - PETE Explanation
 - [Useful PETE Examples](#)
 - Use PETE!
 - [Launch PETE](#)
- Exam**
 - Low Power Design
 - [Exam](#)
- Homework and Quizzes**
 - Leakage & Leakage Reduction
 - [Homework](#)
 - Leakage & Leakage Reduction
 - [Quiz](#)
 - Pete Quiz
 - [Pete Quiz](#)

At the bottom of the interface, the text "LEAN SUPPLY CHAIN - PROFICIENCY" is visible, indicating the next module in the sequence.

EXAM 1

1. One assumption in the derivation of leakage currents in MOSFETS is...
 - A. there are multiple energy levels in the channel.
 - B. that coupling with contacts is ignored.
 - C. that the effect of V_{ds} on ϵ is not being ignored.
 - D. that the flatband voltage > 0 .
 - E. that the Fermi function is approximated by a logarithmic function.

2. Which of the following are advantages of supply gating for logic?
 - I. 5 – 20x leakage reduction
 - II. Scalable
 - III. Ease of Design
 - IV. Floated Output

Purdue NExT – Student Grading Display

The screenshot shows the Purdue NExT Student Grading Display interface. At the top left, the logo reads "PURDUE NExT YOUR EXPERTISE: EVOLVED". On the top right, there is a search bar with the text "Search" and a dropdown menu showing "Steven R Dunlop". The Purdue University logo is also present. Below the header, a navigation bar contains "HOME", "ABOUT", and "NEED HELP?". The main heading is "PURDUENEXT LEARNING EXPERIENCE", with sub-links for "Course overview", "Offering: Summer 2013 Alpha", and "Section: Default". A large "PURDUE NExT." logo is on the right. A central box contains a scoring policy: "Scoring policy: Exams are worth 50% of your grade. Quizzes are worth 30% of your grade. Homework is worth 20% of your grade. A total average of 70% is needed to pass the course." Below this is a table with columns for "NAME", "UNIT PROGRESS", and "CURRENT SCORE". The "UNIT PROGRESS" column uses a series of circles to show progress, and the "CURRENT SCORE" column uses a red bar to show the score. The table lists four students: Stu Dent Sr., Stu Dent Jr., Shawn Rice, and Erich Huebner.

NAME	UNIT PROGRESS details	CURRENT SCORE details
Stu Dent Sr.	Progress bar with 6 circles, 1st circle filled with blue.	Score bar with 70% red fill.
Stu Dent Jr.	Progress bar with 6 circles, 1st circle filled with blue.	Score bar with 50% red fill.
Shawn Rice	Progress bar with 6 circles, 6th circle filled with blue.	Score bar with 0% red fill.
Erich Huebner	Progress bar with 6 circles, 6th circle filled with blue.	Score bar with 0% red fill.

Purdue NExT Working Model

InvertedPendulumIntuition.wm2d

k1 0.00

k2 0.00

k3 0.00

k4 0.00

Pick the control constants k_1, k_2, k_3, k_4 so the block moves to $x=0$ and is vertical.

$$F_c = -k_1 * x + -k_2 * \theta + -k_3 * x' + -k_4 * \theta'$$

Fc —
x —
theta —

ing-Evidence....pdf

Purdue NExT – Discussion Forum

PURDUENEXT LEARNING EXPERIENCE

Course overview Offering: Summer 2013 Alpha Section: Default

PURDUE NEXT

Manage categories

Start a discussion

3 Discussions **New**

search ... Go

- Mine 0
- No discussions found.
- Fundamentals of Nanoelectronics & Non-Equilibrium Greens Function 0
- Quantum of Conductance 0
- Fundamentals of Nanoelectronics including NEGF 0
- OCTAVIEw Manual 0
- OCTAVIEw Manual 0
- Quantum of Conductance 0
- Lean Supply Chain - Proficiency 0
- Activity Explanation 0

Steven R Dunlop 09:37 PM 25 Jun, 2013

B *I* U ↶ x_2 x^2 ↷ ↻ ↺ ↻

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Post Anonymously

Click on a comment on the left to view a discussion or start your own above.

Purdue NExT – Searchable Close Caption

The screenshot shows a video player interface. At the top, there is a banner for the Purdue University Nanoelectronics Research Laboratory. The main slide content reads: "Low-Power Design: Leakage & Leakage Reduction" by Kaushik Roy, with the Purdue University logo and his contact information. The video player shows a progress bar at 00:01 / 15:07 and a search bar containing the text "Search Video". Below the video player, the searchable close caption is displayed, with the word "what" highlighted in blue. The caption text is: "All right, so today what I'd like to do is talk about low-power design and particular actually we'll focus on leakage power consumption. And later on we talk about how to use circuit techniques to reduce leakage power consumption. Later on, we'll talk about dynamic power and other components of power such as short circuit power and so on." Below this, the start of another caption is visible: "Now how bad is the leakage component of power consumption? So the next slide sort of shows you how the leakage power is predicted to go".

PURDUE UNIVERSITY Nanoelectronics Research Laboratory

Low-Power Design: Leakage & Leakage Reduction

Kaushik Roy

PURDUE UNIVERSITY

Prof. Kaushik Roy
@Purdue Univ.

00:01 / 15:07

Search Video

All right, so today **what** I'd like to do is talk about low-power design and particular actually we'll focus on leakage power consumption. And later on we talk about how to use circuit techniques to reduce leakage power consumption. Later on, we'll talk about dynamic power and other components of power such as short circuit power and so on.

Now how bad is the leakage component of power consumption? So the next slide sort of shows you how the leakage power is predicted to go

Features

- Faculty Training
 - Training on LMS
 - Domain specific discussions
- Sections
 - Cohort Programs
 - Faculty Training
 - Common Discussion format
- Sticky Notes

Interactive Activities

- Unity
- Working Model
- PETE
- Lean Pig Activity
- GAMS
- CDF
- OCTAViEw
- Live Scribe
- Cadence / Spice
- VB Application for Operations Management

- Deltak contracted to market Purdue NExT products – they are paid a % of the revenue that adjusts to course volume. Deltak purchased by John Wiley – they will now do global sales of Purdue NExT
- Faculty contacts leveraged
 - Available at no charge to Purdue University students
 - North America universities (example - ME courses)
 - North America institutions (government, nonprofits)
 - Corporations for employee skills development
 - K-12 Teacher Professional Development (Inspire)
 - K-12 Students (STEM)
 - India (both to companies and universities)
 - South America (Colombia)

Path forward

- Share all technology choices with Purdue faculty and serve as a resource for faculty
- Incorporate faculty learning outcomes assessment and input to improve course structure and quality
- Future looking ideas – leverage large datasets at Purdue and elsewhere, immersive interdisciplinary courses, flipped classroom etc.
- Use of best in class tools (Hubzero, Kaltura, 3Play, Gengo, Videography)
- Faculty lead Evaluation / Quality teams
- CEC credits for badges (5 credits per badge)

Possible Datasets

- Data sets – high frequency trading, trade data, retail data, GPS trails
- Audio files – soundscapes (frequency files)
- Video files –
- Twitter files

Please call us to discuss opportunities at
Purdue NExT

Contact Details

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Questions
THANK YOU