



Connecting Industry to Education

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KITE

- ‘Khronos Institute of Training & Education’ - an initiative to increase communication and cooperation between **INDUSTRY** and **EDUCATORS**

Three Goals:

- Accelerate development of Khronos API educational materials and guidelines
- Encourage education and certification for Khronos APIs to be widely available
- Ensure quality and consistency consistency for Khronos API certifications



Khronos APIs with Strongest Training Demand



Desktop 3D Graphics



Mobile 3D Graphics



Web 3D Graphics



Heterogeneous Parallel Programming

Industry Demand | Competitive Pressure

- Industry is requesting Proficiency Certification in Khronos technologies
 - Complement to full academic qualifications: e.g. Cisco or Microsoft Certification



The screenshot shows the NVIDIA Developer Zone website. At the top, there's a navigation bar with 'DEVELOPER CENTERS', 'TECHNOLOGIES', 'TOOLS', 'RESOURCES', and 'COMMUNITY'. The main heading is 'CUDA Training'. Below it, there's a sub-heading 'CUDA University Courses' and a list of links to various training resources, including 'Introductory CUDA Technical Training Courses', 'CUDA University Courses', and 'CUDA Seminars and Tutorials'. There's also a section for 'Introductory CUDA Technical Training Courses' with links to 'Courses', 'Object: CS344 Intro To Parallel Programming', 'Volume II Introduction to CUDA Programming', and 'Volume II CUDA Case Studies'. A small image of a GPU is visible on the right side of the page.

<https://developer.nvidia.com/cuda-training>



The screenshot shows the NVIDIA CUDA Training and Consulting page. The heading is 'CUDA Training and Consulting'. Below it, there's a paragraph: 'The following organizations offer consulting and training services related to the CUDA parallel computing platform and programming model.' There's a link to 'Learn more about programming GPUs and tools/libraries by checking out the GPU Technology Conference 2012 sessions.' Below this, there's a table of consulting partners:

Partner	Areas of Expertise	Services Offered
 AccelerEyes	<ul style="list-style-type: none">• Defense and aerospace• Image and signal processing• Linear algebra, sparse matrices, statistics• Computer vision, machine learning• Genomics and life sciences• Media, mobile• Energy	<ul style="list-style-type: none">• CUDA Consulting• CUDA Training• Porting code to CUDA platforms
 Acceleware Ltd.	<ul style="list-style-type: none">• Electromagnetics• Oil & Gas- HTM, RTM, CSEM• Imaging• Linear Algebra• Finance	<ul style="list-style-type: none">• CUDA Training• CUDA Consulting
 Alexandra Institute Ltd.	<ul style="list-style-type: none">• 3D Simulation• 3D Visualization• 3D Projection• 3D Computer Graphics	<ul style="list-style-type: none">• CUDA Consulting• CUDA Training• Software Development• Security Solutions
 ANEQ	<ul style="list-style-type: none">• High Performance Computing for a wide range of markets	<ul style="list-style-type: none">• CUDA Consulting• CUDA Training
	<ul style="list-style-type: none">• Seismic - Oil & Gas• Linear Algebra, Signal and Image processing	<ul style="list-style-type: none">• CUDA Training• CUDA Consulting

http://www.nvidia.com/object/cuda_consultants.html

Khronos API Training Already Underway

The screenshot shows the AccelerEyes website with a navigation bar containing 'Products', 'Services', 'Examples', 'Purchase', and 'Blog'. The main content area is titled 'GPU & Accelerator Training Courses'. It includes a sidebar with 'Training' options (CUDA, OpenCL) and a 'NEWSLETTER' sign-up form. The main text describes the training courses, their benefits, and the fee included. Below this is a section for 'Upcoming Training Courses and Locations' with two columns: 'CUDA' and 'OpenCL', each listing dates and locations for various training sessions.

GPU & Accelerator Training Courses

AccelerEyes provides advanced GPU training lectures and hands-on practicals. In a matter of days, you and your team will become proficient in state-of-the-art GPU programming techniques.

Attendees will receive the latest industry knowledge and techniques for GPU computing in CUDA and OpenCL. We have helped thousands of organizations speedup their code and our primary objective is to help you increase productivity while maximizing the return on your GPU hardware.

Training Courses

AccelerEyes offers up to four days of specialized GPU training in CUDA and OpenCL programming. We recommend that attendees have a working knowledge of C/C++ in order to gain the most from the training courses.

Fee Includes

All training courses come with:

- Instruction by an excellent and interesting expert. Many hands-on exercises
- Use of a laptop with CUDA and OpenCL capable GPUs and CPUs
- Choice of Linux or Windows operating system
- Printed manual of lecture material
- Electronic copy of programming exercises
- Certificate of Completion

Upcoming Training Courses and Locations

CUDA	OpenCL
Apr 22-23, CUDA Training, Seattle, WA	Apr 24-25, OpenCL Training, Seattle, WA
May 6-7, CUDA Training, Austin, TX	May 6-9, OpenCL Training, Austin, TX
Mar 28-29, CUDA Training, Atlanta, GA	May 30-31, OpenCL Training, Atlanta, GA
Jun 10-11, CUDA Training, Baltimore/Washington D.C.	Jun 12-13, OpenCL Training, Baltimore/Washington D.C.
Jul 8-9, CUDA Training, San Jose, CA	Jul 10-11, OpenCL Training, San Jose, CA
Sep 2-3, CUDA Training, Boston, MA	Sep 4-5, OpenCL Training, Boston, MA
Sep 23-24, CUDA Training, Baltimore/Washington, D.C.	Sep 25-26, OpenCL Training, Baltimore/Washington, D.C.
Oct 7-8, CUDA Training, Houston, TX	Oct 9-10, OpenCL Training, Houston, TX
Oct 21-22, CUDA Training, Atlanta, GA	Oct 23-24, OpenCL Training, Atlanta, GA
Nov 4-5, CUDA Training, Baltimore/Washington, D.C.	Nov 6-7, OpenCL Training, Baltimore/Washington, D.C.
Dec 2-3, CUDA Training, New York, NY	Dec 4-5, OpenCL Training, New York, NY

E.g. AccelerEyes working with KITE for OpenCL training:

1. Feedback on the specification for clarity
2. Getting questions answered on how best to teach about the spec
3. Working together for a Khronos 'Seal of Approval' for their Course materials and Certificate
4. Cross promotion with Khronos

<http://www.accelereyes.com/services/training>

Education, Training and Certification

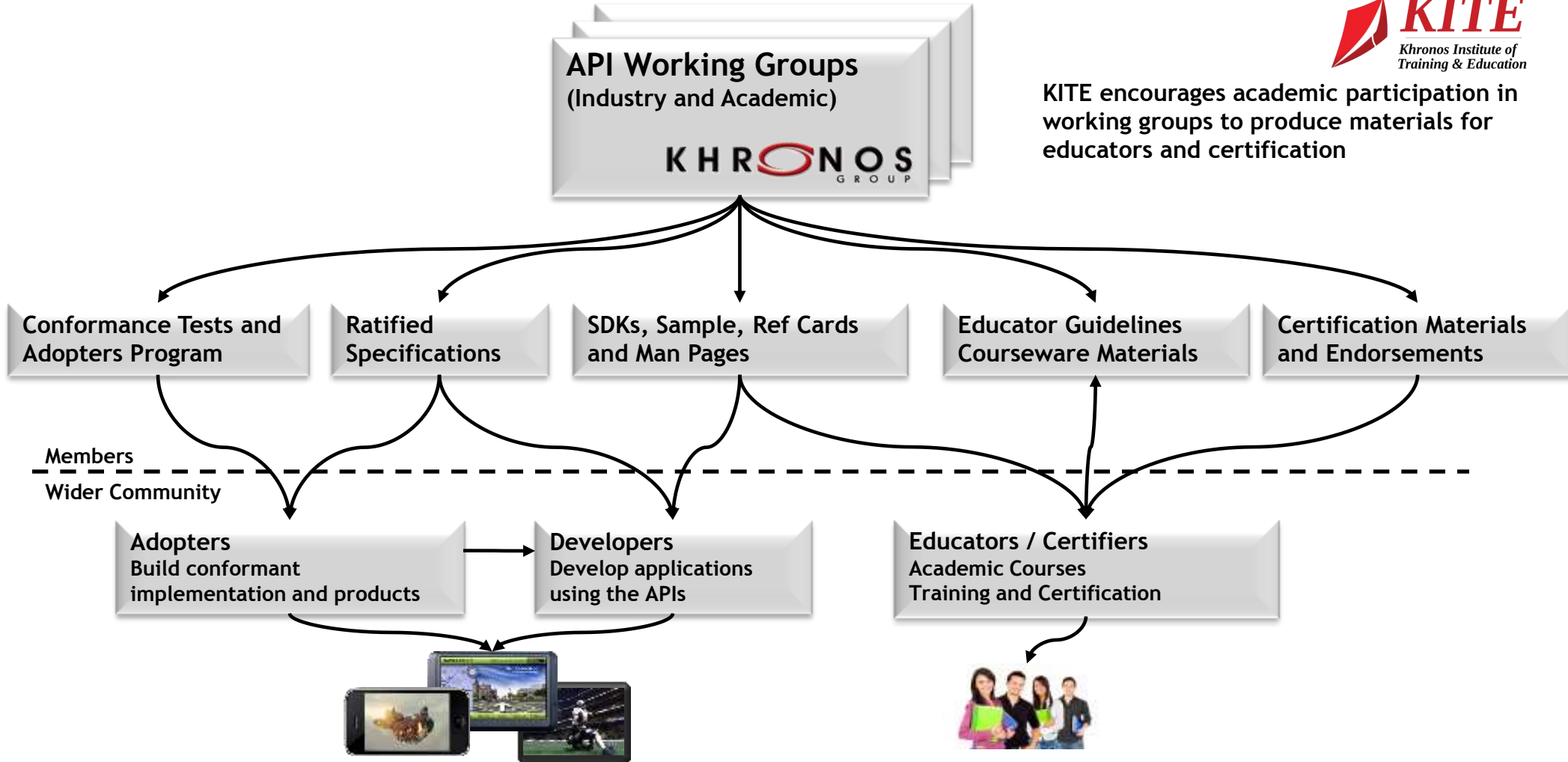
- **Diverse range of training and education partners emerging**
 - Universities, Colleges and polytechnics
 - Government funded institutes
 - Commercial training companies
 - Implementation vendors
- **Education is academically focused**
 - Training is vocationally focused
- **Geographically specific**
 - Language and culture differences
- **No one size fits all but KITE can help generate:**
 - Educator guidelines and best practices
 - Materials for integration into courseware
 - Certification materials and endorsements



Khronos Working Groups



KITE encourages academic participation in working groups to produce materials for educators and certification



KITE Inside Khronos

- **KITE activities integrated with other working group activities**
 - Closer communication and cooperation between engineers and educators
 - Educational materials being developed in parallel with specifications
 - Valuable feedback into the specification process
- **Each KITE-active Working Group electing an Education Chair**
 - Someone with educational domain expertise and experience
- **Add educational topics to working group agenda and deliverables**
 - Use TSG structure to offload discussions if becomes distracting
 - Output still approved by, and in synch with, working group activities
- **Education Chair has two main responsibilities**
 - Foster generation of Khronos educational guidelines and materials
 - Reach out to third party educational and training partners



Academia is Responding Positively

- Thirteen New Academic Members joining since announcing Kite!

Khronos Academic Member	Country	Date Joined Khronos
University of Bristol	Great Britain	August 2012
ITRI	Taiwan	July 2012
Oregon State University	USA	May 2012
Politecnico di Milano	Italy	March 2012
Universita di Bologna	Italy	March 2012
Imperial College London	Great Britain	January 2012
University of Toronto	Canada	May 2011
Kyungpook National University	Korea	March 2010
Seoul National University	Korea	May 2009
Institute for Information Industry	Taiwan	September 2012
ETRI	Korea	June 2014 (Rejoined)
Korea University	Korea	April 2014
MIT Lincoln Lab	USA	November 2013

Agenda for This Morning!

- **Coursework design for Khronos APIs in KNU**
 - Prof. Nakhoon Baek, Kyungpook National University
- **Example of Optics Applications using OpenCL**
 - Prof. Kwan-Hee Yoo, Choongbuk National University
- **WebGL experiences at Ajou University**
 - Prof. Jung-Ju Choi, Ahoi University
- **Introduction of Smart Creation Center and OpenGL ES-based Mobile Applications**
 - Prof. Kyuman Jeong, Daegu University
- **Teaching OpenGL Compute Shaders**
 - Prof. Bailey, Oregon State University