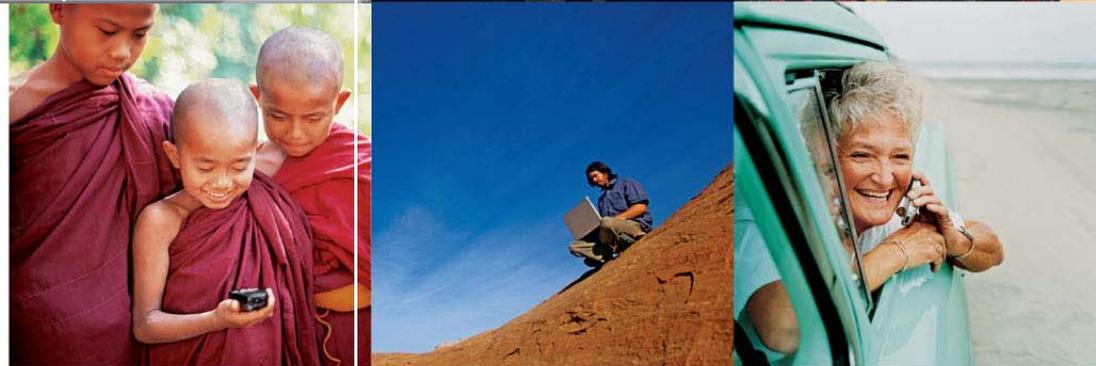




Promoting Education
About Standardization
In North America

NIST

May 8, 2009



Presented by Susan Hoyler

Qualcomm Incorporated

- ❑ **Global leader in developing and delivering innovative digital wireless communications solutions based on CDMA and other advanced technologies.**
- ❑ **Partners with wireless operators, device manufacturers, independent software vendors, distribution suppliers in driving adoption of mobility solutions based on 3G CDMA and other digital technologies.**
- ❑ **Designers of semiconductor chips which are used in wide range of devices.**

INNOVATION – EXECUTION – PARTNERSHIP

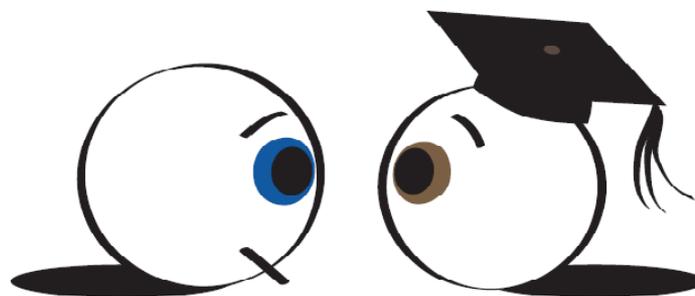


- **Founded in 1985**
- **FORTUNE 500® Company**
- **NASDAQ Symbol: QCOM**
- **~ 6,800 U.S. and 35,100 international patents and patent applications of CDMA and related technologies including WCDMA and OFDMA**
- **Member of the S&P 500 Index**
- **“Top 500 Technology Companies” — Information’s Week**
- **“100 Best Companies to Work for in America” — FORTUNE**

Relationships with Universities

QUALCOMM is largely a research and development company, and has very little manufacturing or consumer marketing. Though the company does not manufacture, we are the world's largest fabless* semiconductor company

QUALCOMM works closely developing and maintaining ties with universities to develop technology in collaboration



Qualcomm Corporate R&D
University Relations

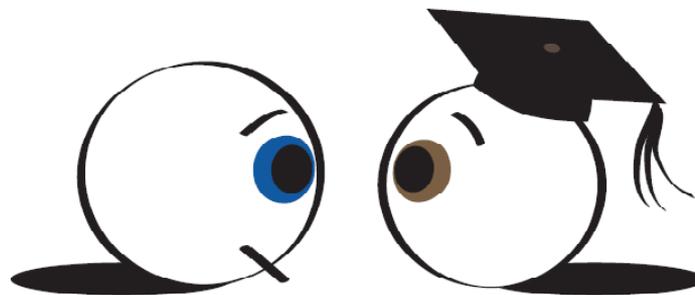
*design but do not fabricate

Profile of Qualcomm Employees

Of its approximately 15,000 employees worldwide, 60-65% of its employees have engineering degrees.

Of these engineers, approximately 50% have PhDs, 35% have Masters, and 15% have Bachelors Degrees.

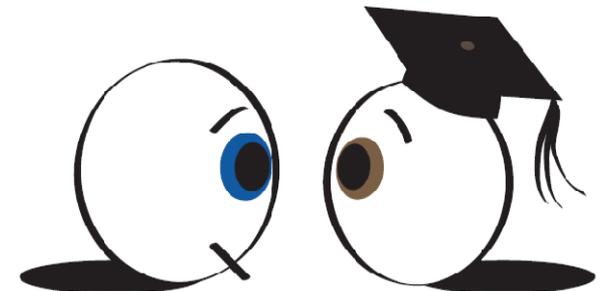
Of these engineers, approximately 25% are born in the USA.



Qualcomm Corporate R&D
University Relations

Relationships with Universities

Berkeley	San Diego State University
Caltech	Stanford
Carnegie Mellon University	University of Massachusetts
Columbia	University of Toronto
Cornell	UC Santa Barbara
GA Tech	UC Irvine
Maryland	UC Los Angeles
Michigan	UC Riverside
MIT	UC San Diego
Ohio State	University of Illinois at Urbana- Champaign
Penn State	University of Waterloo
Princeton	University of Southern California
Purdue	UT of Austin
Rensselaer Polytechnic Institute	VA Tech
Rice	Vanderbilt
Rutgers	Wisconsin



Qualcomm Corporate R&D
University Relations

Promoting Education about Standardization in North America

**How can academia,
government,
industry and SDOs better
integrate standards in the
USA education system?**

Status Quo:

University Curriculum Focus on Technical Subject Matter

- **Standards appear to be viewed as an elective or as a subject that engineers will learn once they obtain employment**
 - Underlying issue is 4 year academic program for engineering today is packed with core subjects.
- **Curricula at engineering schools have little room for expansion to include ancillary courses**
 - Most engineering curricula do not require courses that engineers in industry need in addition to technical knowledge such as related courses (i.e. project management, standards, ethics, etc.)

College Graduate's Familiarity with Standards

A typical engineering graduate has limited knowledge of standards.

What they might know...

- **Just acronyms (alphabet soup) ANSI, IEEE, IEC**
- **Fundamental technology aspects of field**
- **Concepts and basic technology aspects of a standard**
 - **University may have used example from standard to teach engineering principle**

College Graduate's Familiarity with Standards

A typical engineering graduate has limited knowledge of standards.

What they most likely don't know ...

- **Basic characteristics of standards systems & processes**
- **Varying degrees/types of standards bodies in USA and globally**
- **Pros and cons of standards**
- **Benefits to industry as a whole or how standards fit into a larger business context**

Bridging the Gap: CONVEY THE NEED

- **Industry technical executives need to provide constructive input to universities that some training/education on standardization is desired**
 - Many universities with engineering programs reach out to and invite high level technical executives to sit on Advisory Boards to help plan for future academic programs and to provide input to keep the curriculum relevant.
 - Likewise, many high level technical executives often sit on advisory boards of their Alma Mater or of Universities and can offer practical input and experience.

Bridging the Gap: COOPERATE TO FILL THE NEED

- **Universities can offer a variety of standards education “opportunities” ranging from small-scale to large-scale depending on resources available**
 - Initially, start small such as offering a one time overview broad presentation (one class) based on why standards exist, how standards bodies include many views, etc.
 - Considering offering a seminar series with attendance requirement but no grade to complement required technical courses.

Developing University Curriculum-Phased Approach

- **Consider offering an SDO example or case study depending on technical discipline**
 - For example, if computer or IT related, a module from IEEE
 - Provide example of successful/unsuccessful case studies
- **Consider developing Senior Course which teaches ancillary skills and includes standards as one of the tools needed.**

Developing University Curriculum-Phased Approach

- **Consider packaged modules (in class or online)**
 - Universities can work collaboratively with SDOs and/or companies which may have “pre-packaged” modules, or modules which can be modified for outside use.

- **Consider development of online courses such as ANSI Standards Portal.**
[\(http://www.standardslearn.org/\)](http://www.standardslearn.org/)

Bridging the Gap: COLLABORATE ACROSS ALL SEGMENTS & THINK GLOBALLY

- **Outside the USA there is great emphasis on standards education and a more formal collaborative process set up with industry, government and academia.**
 - Growth area as specialization in technical programs not only in China (such as Tsinghua University) but in other countries.
 - Other countries have greater participation and collaboration by universities and government. Often industry is represented through trade associations or governmental agencies who work jointly in creating University courses on standardization.
 - Need for greater cooperation and collaboration from all segments in USA.

Promoting Education about Standardization in North America: Industry Perspective

SUMMARY

- **Greater interaction between practitioners in technical industries and those who plan university curricula on what kind of skills future practitioners need.**
 - Hiring companies provide input to University Advisory Boards which in turn often provide input to design and plan the future direction of curricula.
 - Experienced industry technical staff outreach to individual universities and offer to teach small 3 hour course or arrange for seminar series.

Promoting Education about Standardization in North America: Industry Perspective

SUMMARY

- **Greater collaboration in development of courses (ranging in scale such as one time overview to a series of seminars to a one semester course for graduating seniors in technical fields to online modules).**
- **Greater collaboration and cooperation between academia, SDOs, industry and government in preparing materials to fill the needs identified in USA.**
- **Greater outreach to universities worldwide and sharing of standards training programs in common areas such as ITU, IEC, ISO.**

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Thank you