Microsoft Research Update

Rick Rashid
Senior Vice President
Microsoft Research
MSR Mission Statement

• Expand the state of the art in each of the areas in which we do research

• Rapidly transfer innovative technologies into Microsoft products

• Ensure that Microsoft products have a future
Microsoft Research

Research locations
- Redmond, Washington (Sep, 1991)
- San Francisco, California (Jun, 1995)
- Cambridge, United Kingdom (July, 1997)
- Beijing, China (Nov, 1998)
- Silicon Valley, California (July, 2001)
- Bangalore, India (Jan, 2005)
- Cambridge, Massachusetts (July, 2008)
Organizing for Innovation

• University organizational model
  – Flat structure, critical mass groups
• Open research environment
  – Aggressive publication of results in peer-reviewed literature
  – Frequent visitors, daily seminars
• Strong ties to University Research
  – Nearly 15% of basic research budget directly invested in universities
    • Lab grants, research grants, fellowships, etc.
  – Hundreds of interns and visitors
Expanding the State of the Art

• Over 40 peer-reviewed publications
  – 13% of papers at 2009 CHI (UI)
  – 22% of papers at 2009 SIGCOMM (Communications)
  – 28% of papers at 2009 SIGIR (Info retrieval)
  – 32% of papers at 2009 SOSP (Operating Systems)

• Community leadership
  – Professional societies
  – Journals
  – Conferences
World Class Talent

- 1 Fields Medal
- 4 Turing Awards (new: Chuck Thacker, 2009)
- 2 Draper Prizes
- 2 IEEE Emanuel R. Piore Awards
- 1 Kyoto Prize in Advanced Technology
- 4 Royal Academy of Engineering Awards
- 2 John von Neumann Medals
- 1 National Academy of Sciences Award
- 1 MPAA Academy Award (Oscar)

- 20 ACM Fellows
- 11 IEEE Fellows
- 3 Royal Society Fellows
- 15 Nat’l Academy of Engineering Fellows
- 3 Amer. Acad. of Arts & Sciences Fellows
- 1 CHI Lifetime Achievement Award
- 1 Foreign Member, Royal Swedish Academy of Sciences
- 1 Amer. Assoc for Adv. Of Science Award
- 1 Order of the British Empire

- **Chuck Thacker, 2009 ACM Turing Award**
- Butler Lampson, 1992 ACM Turing Award
- C.A.R. Hoare, 1980 ACM Turing Award
- Gary Starkweather, *Inventor of the laser printer*
- Jim Blinn, *Graphics pioneer*
- Michael Freedman, *Fields Medal winner*
- Gordon Bell, *Father of the VAX*
- Bill Buxton, *ACM CHI Lifetime Achievement Award*
- Rick Rashid, *creator of the MACH Kernel*
Value of MSR to Microsoft

• Source of IP and new product technologies
  – MSR generates roughly 25% of the Company’s patents and generally MSR patents are more “fundamental”

• Problem solving
  – Ability to bring smart people to bear rapidly on hard problems confronting products, product groups or the company

• Early warning system
  – Ears to the ground in new areas across a broad range of technologies
Driving Technologies into Products

• Focused technology transfer effort
  – Program management team with sole focus on tech transfer
• Researchers on product incubation “advisory” boards
• “Mindswaps” – joint product/research offsites
• Joint product/research teams, e.g.
  – ClearType (Windows XP)
  – Datamining (SQL 2000)
  – Natural Language & Speech (Office)
  – TabletPC
• Incubations
  – Robotics Studio, ResponsePoint, etc.
## Tech Transfer Examples

### Windows
- Virtual WiFi
- East Asian handwriting recognition
- DirectX 11
- Smart correction for Tablet PC
- Static Device Verifier
- Network Map
- Automatic identification of songs (WMP11)
- Ink Parsing architecture
- Algorithm for Phish Detective (IE 7)
- Windows Audio Improvements (acoustic echo cancelation, speech enhancement, microphone arrays)
- Desktop search
- UI: Carousel view, 3dish card shuffle interface, CardSpace
- WiFi simple configuration
- IPv6
- ProbeGap
- Compound TCP
- Peer name resolution protocol
- Windows Media Photo

### Bing
- Categorized search
- Local search classifier
- Ranking
- Toolbar parser
- Improved relevance
- Session memory
- Search galleries
- Sentiment extraction

### Microsoft Office 2010 & 2007
- Image background removal
- SQM data analysis
- Search relevance ranking improvements (SPS)
- Speller improvements
- Speech
- Ribbon UI
- Smart Chart Labels in Excel

### Other Contributions to Products
- Speech: recognition & synthesis
- Xbox Graphics, net probing
- Cryptography libraries
- Windows Media Format audio codec
- Handwriting recognition
- Information retrieval for SPS, MSN
- Development tools
Key Challenges for the Future

• Platform Elements
  – Networking, distributed systems, operating systems
  – Cell phone and other devices
  – Sensor networks
  – Security, cryptography, protection against malware

• Reinventing Software Development
  – Languages, tools, compilers
  – Collaborative development

• Data and Documents
  – Database architectures, data mining
  – Search
  – Fighting spam & phishing

• User Interfaces, Social Computing, and Collaboration
  – New UI – speech, ink, gesture, natural language, large displays, surface computing
  – Meetings and collaboration
  – Modeling people, groups, info
  – Technologies for emerging segments

• Media
  – Graphics and multimedia
  – Digital photography and video

• Science & healthcare
  – Quantum computing, astronomy
  – Algorithms, cryptography
  – AIDS vaccine, memory loss
  – Education
Update of Microsoft Research Asia

Hsiao-Wuen HON
Managing Director
Microsoft Research Asia
MSR Asia in the Past 12 Years

- Founded on Nov. 5th, 1998
- 3000+ papers published on top-tier journals / conferences, 20+ best paper awards
- 300+ technologies transferred to MS products
- 20+ technologies licensed to other companies
# Academic Achievement

Extensive publication: over 3000 publications to date

- CVPR 2010/09/08/07: 20/8/15/16 papers
- SIGIR 2010/09/08/07: 5/8/8/7 papers
- SIGGRAPH 2010/09/08/07: 7/6/8/7 papers
- WWW 2010/09/08/07: 6/9/8/6 papers
- ACL 2010/09/08/07: 4/6/5/4 papers
- SIGKDD 2010/09: 3/7 papers
- ACM Multimedia 2009/8/7: 6/8/8 papers
- NIPS 2009: 5 papers
- COLING 2010: 10 papers
- SIGMOD 2010: 5 papers
- ACM Multimedia 2010: 6 papers
- Mobicom 2009: over 10% of papers
- Best paper awards in ACM Multimedia, IEEE RTAS, ICDAR, IEEE CSVT, NSDI’09, CVPR, ACCV, CIKM, ...

## Academic Community

- Extensive visitors and speakers program
- Professional Services: TVCG, PCM, WWW, SIGIR, SIGGRAPH, Mobicom, CVPR, ...
People and Research Areas

Baining GUO
Visual Computing - Yi MA
Graphics - Baining GUO
Multimedia - Shipeng Li, Feng Wu
Theory - Baining GUO

Weiyi MA
Web Search & Mining, Natural Language Processing – Weiyi MA, Ming Zhou, Hang Li, Jirong Wen, Chin-yew Lin
Human Computer Interaction - Desney Tan

Feng ZHAO
System - Zheng Zhang, Lidong Zhou
Network & Wireless - Yongguang Zhang
Hardware - Feng-Hsiung Hsu
Software Analytics - Dongmei Zhang

Hsiao-Wuen HON
Machine Learning
Zheng CHEN
Speech
Frank SOONG
Engineering
Jonathan TIEN
Technical Strategy
Eric CHANG
Computing in the Next 10 years

• 3 Screens + 1 Cloud
  – Software + Service
  – Rich client (device) experience
  – Internet services - software as a service
    • Emails, IM’s, internet search, ...
  – Clients + Cloud experience
    • Clients are becoming more powerful and capable
    • Services in the cloud provide efficiency, scalability and redundancy
Demo: Microsoft Kinect
Demo: Microsoft Kinect
Computing in the Next 10 years

- Inter-disciplinary and multi-disciplinary
  - Tough computing challenges span across disciplines
  - New technology/business opportunities:
    - eHeritage
    - Education
    - Healthcare
    - Environment
Demo: eHeritage
Demo: eHeritage
Opportunities in Asia

- **Strong focus on education & engineering**
- **Big talent pool**
- **Largest Internet and mobile phone user population**
- **Aspiration to innovate technologies for Asia and the world**
Poised to lead the next decade of innovation

Committed to a continued partnership with academia

Together we Innovate!
THANK YOU!