CEO Summit

Discovery happens here.





Tech To Serve

Ed Lazowska Bill & Melinda Gates Chair Paul G. Allen School of Computer Science & Engineering University of Washington

May 16, 2018

Welcome!







Seattle in 1977















Since that time ...











McCAW CELLULAR, INC. Today's mobile communication services





Desktop publishing







Electronic commerce



Commercial cloud computing



1970 Ford Mustang



2015 Ford Mustang

Size: about the same Speed: about the same Efficiency (MPG): about the same Value (cost relative to performance): about the same



1971 Intel 4004 (2,300 transistors)





2015 Intel Xeon (4,300,000,000 transistors)

Size: area occupied by a transistor reduced by **1,000,000x** Speed: operations per second increased by **100,000x** Efficiency (operations per watt): improved by **6,750x** Value (dollars per instruction): improved by **2,700x**



1970 Ford Mustang

Keon[®] E7



2015 Intel Xeon

What if cars had improved as rapidly as microprocessors?



Size: A car would be smaller than an ant (About 1/5th of an inch long)



Speed: A car would go 6,000,000 miles per hour (San Francisco to New York in 1.7 seconds)





Efficiency: A car would get 100,000 miles per gallon (San Francisco to New York on 1/2 cup of fuel)



Cost: A car would cost less than \$10

Computer Science has changed also: From smaller/faster/cheaper to tackling societal





Energy & Sustainability Electricity \$46.27 (329) iii. UNIVERSITY OF WASHINGTON PLAD













From smaller/faster/cheaper to tackling societal challenges: Tech To Serve







Mobile Phones for Health

Shwetak Patel Washington Research Foundation Entrepreneurship Endowed Professor Paul G. Allen School of Computer Science & Engineering University of Washington

May 16, 2018

Point of Care Diagnostics



Another Paradigm Shift in Health Care





Continuous Capture of Physiological Data



HR

bpm



The Modern Smartphone



Mobile Health Sensing

Using existing sensors on mobile phones for health sensing



Using Mobile Phones for Diagnostics



SpiroSmart: Mobile Phone Spirometer





SpiroSmart: Mobile Phone Spirometer



SpiroCall: Expanding to Any Phone



CoughSense: Tuberculosis Study in South Africa



HemaApp: Measuring Hemoglobin with a Phone



Measuring Hemoglobin with a Phone



BiliCam: Newborn Jaundice



BiliScreen: Pancreatic Cancer





OsteoApp: Screening Osteoporosis



OsteoApp: Screening Osteoporosis



OsteoApp: Screening Osteoporosis













Osteoporosis

Challenges and Opportunities

Integration into commodity phones Trust Regulatory Patient – Provider relationship Training the next generation health professionals

Thanks!