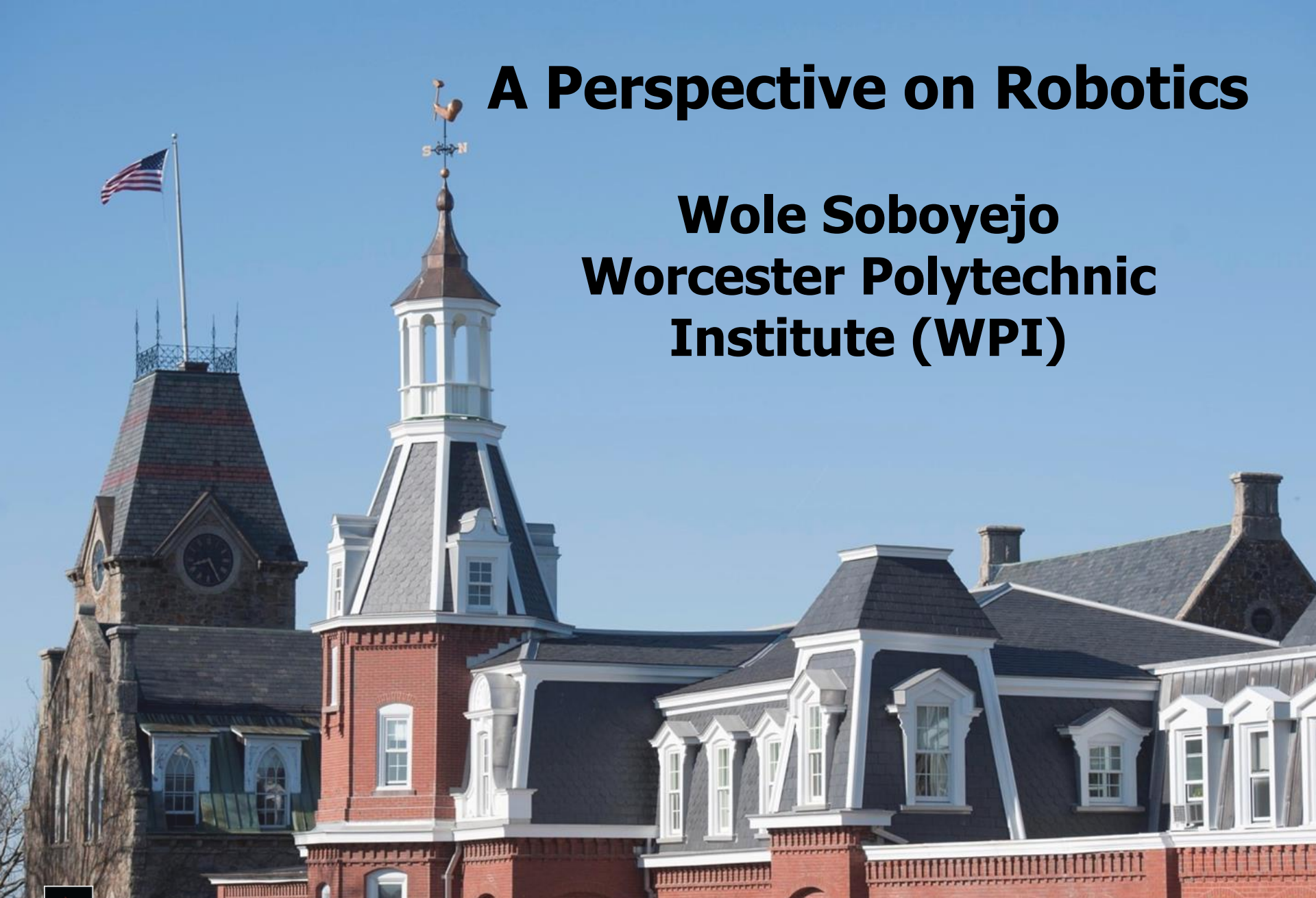


A Perspective on Robotics

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A Tale of What Could Have Been

- In 1984 I was completely excited by the field of robotics when I was an undergraduate student in mechanical engineering at King's College London
- I even did my Senior Thesis on Robotics working with Prof. Stan Earles
- For me the programming of the robotic arm and the photo-detection of motion gave me lots of room to play and learn how to engage in research
- I almost went to Stanford to study robotics and artificial intelligence
- I even imagined a future in which robotics would control much of what would happen in the next 30 years beyond....
- However we over-estimated the potential in the short term...

Programming of a Robot Arm

- Project combined elements of solid mechanics, programming, algorithm development, computer vision and design
- Supervised by Stan Earles
- Sponsored by the Ford Motor Company

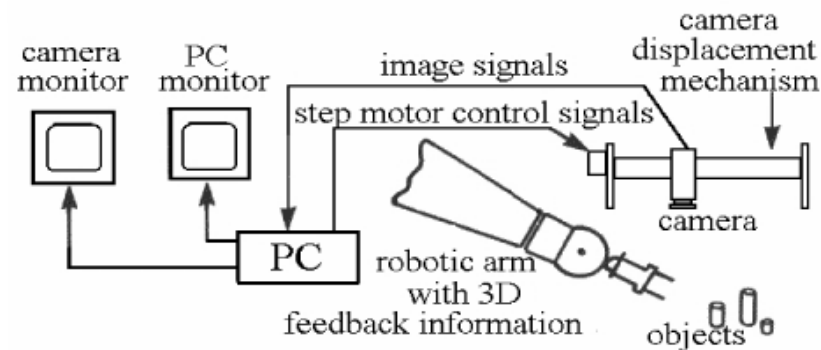
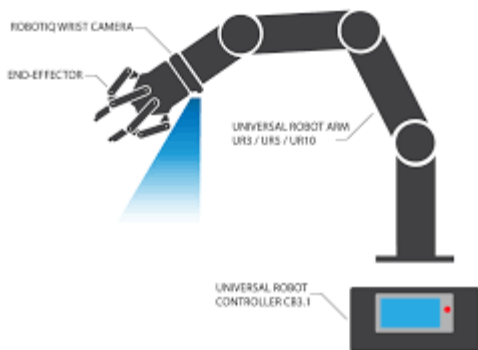
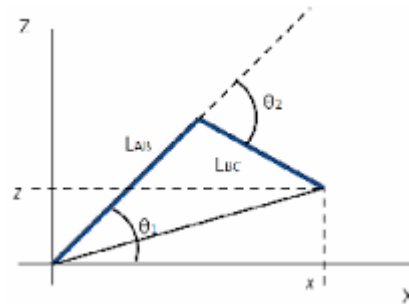
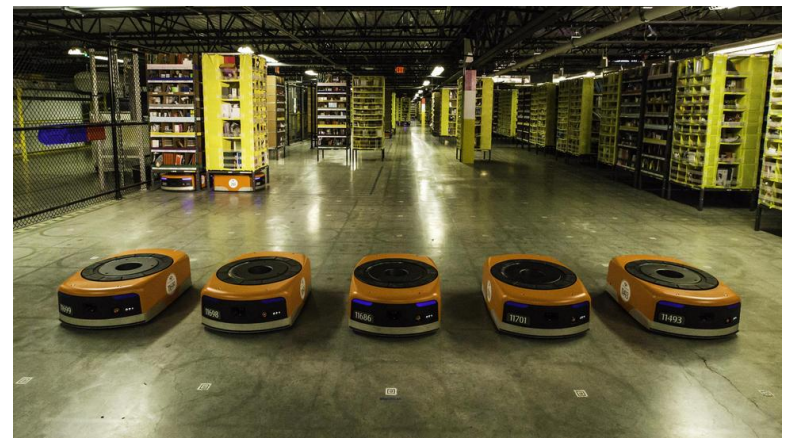


Figure 1. Stereo vision system scheme.



Robotics in the Real World....

- By 1985 everyone thought that robotics would revolutionize the world
- However the impact of robotics was modest in the short term
- Amara's Law – We tend to overestimate the effect of technology in the short run while we underestimate the effects of technology in the short run
- Recent example of Amazon Robotics



Inspiring Young People and a New STEM Culture: Battlecry WPI/Africa

MS4SSA
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Sub-Saharan Africa



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Robotics – A Source of Inspiration for STEM to Young People

- Robotics is a source of inspiration for young people to pursue STEM
- This has been recognized Dean Kamen (WPI Alum) and founder of FIRST Robotics ...
 - Alloys
 - Semiconductors
 - Polymers
 - ...

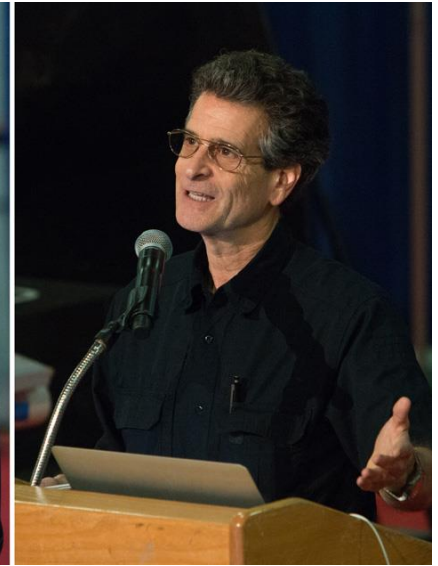
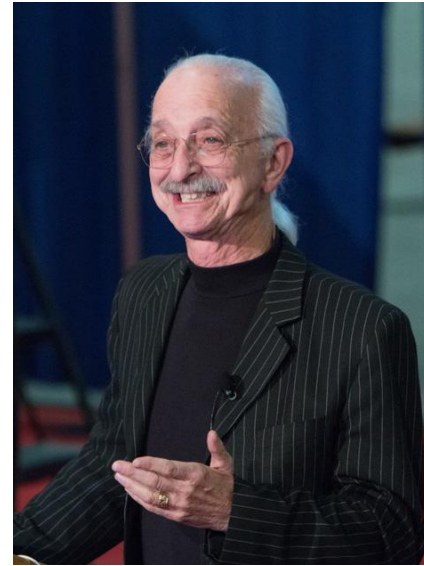


| Hard materials
| Soft materials



FIRST and FIRST Global Robotics

- First was developed by Dean Kamen and Prof. Flowers of MIT to inspire young people to explore careers in STEM
- The idea was to use extracurricular activities to engage students in STEM without a direct focus on the study of the actual subjects
- Instead the students work on robotics projects as part of teams across several high schools across the world
- More recent efforts have expanded the scope of FIRST to FIRST Global which is a new initiative to further engage the world in robotics
- WPI has worked closely with FIRST and FIRST Global since their inception



Introduction to FIRST Global

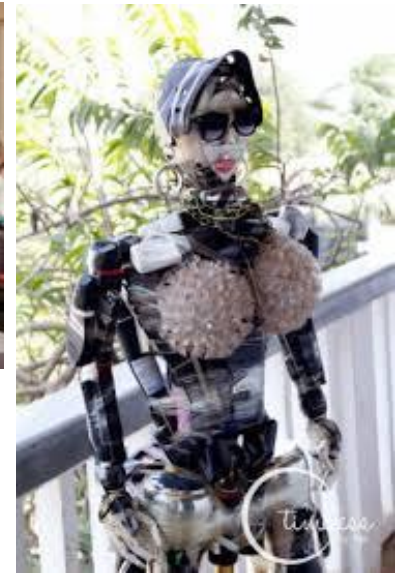
FIRST Global

- A new idea by Dean Kamen to further engage the world in robotics
- Similar to the Olympic Games of Robotics
- Event to be held in Washington DC in July
- Strong effort to recruit teams from Africa
- Key role of WPI in mentoring teams and supporting this initiative



Robotics in Africa

- Tremendous interest in robotics across Africa
- Several countries participating in FIRST Global
- Strong efforts in Kenya, Ghana, Senegal, Rwanda, Zimbabwe....
- Need to build on these efforts to encourage the youth to pursue STEM fields



Introduction of MS4SSA Robotics Modules

- Build on WPI's rich history of STEM outreach to schools
- Introduce three components of robotics
- Extend this to Battlecry WPI/Africa
- Inspire young Africans and their families to enjoy STEM culture
- The components of WPI MS4SSA Robotics Program
 - Hands-on sessions
 - Programming
 - Mechanisms
 - 3D Printing/Rapid Prototyping
 - Perspectives

Summary and Concluding Remarks

- This talk presents a perspective on robotics
- First the evolution of robotics is presented over the past 30 years – my personal perspective!
- This was followed by a discussion of the role of robotics in stimulating the interest of youth in STEM fields
- The role of FIRST Robotics and Global FIRST Robotics was also explored
- This was followed by a review of robotics within an integrated context (programming, mechanisms and rapid prototyping) – emerging interest and opportunity
- We look forward to engaging all African countries in WPI's MS4SSA modules on robotics.....

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