Microsoft

PhD Summer School 2013

1-5 July 2013

Scarlet Schwiderski-Grosche

Welcome!

60 PhD students

- 20 MSR PhD Scholars
- 11 students from Max Planck Institutes
- 18 students from Cambridge Computer Lab
- 11 students related to our joint institutes (BSC and INRIA) and Advanced Technology Labs (Germany, Egypt, and Israel)

From

- 10 countries – Europe PLUS Egypt, Israel and Saudi Arabia

ENJOY YOUR VISIT and HAVE FUN!

Tuesday 2 July 2013

09:00 **Welcome to Microsoft Research Cambridge**
Andrew Blake, Microsoft Research

09:30 **Welcome to PhD Summer School**
Scarlet Schwiderski-Grosche, Microsoft Research

10:00 Break

11:00 **Strategic Thinking for Researchers**
Andy Gordon, Microsoft Research

12:00 Lunch/Poster Session 1

14:00 Parallel Session

- **Proving That Programs Eventually Do Something Good**
  Byron Cook, Microsoft Research
- **Human Computing and Crowdsourcing in Search Evaluation**
  Gabriella Kazai, Microsoft Research

15:00 Break

15:30 Parallel Session

- **Transformations in HCI: from Human Factors to Human Values**
  Abigail Sellen, Microsoft Research
- **Programming Proofs and Proving Programs**
  Nick Benton, Microsoft Research

Tuesday 2 July 2013

16:30	Coach Transfer to Red Lodge Karting
17:00	Go-Karting at Red Lodge Karting and BBQ
21:30	Coach Transfer to Selwyn College

Wednesday 3 July 2013

09:30 Parallel Session

- The Data Center Hardware is Changing, but do the Applications Care?
  Ant Rowstron, Microsoft Research
- Modelling All Life on Earth. Yes, Really!
  Drew Purves, Microsoft Research

10:30 Break

11:00 Parallel Session

- Predictable Data Centers
  Hitesh Ballani, Microsoft Research
- Software for Programming Cells
  Andrew Phillips, Microsoft Research

12:00 Lunch/Poster Session 2

14:00 3D Vision in a Changing World
Andrew Fitzgibbon, Microsoft Research

15:00 Break

15:30 Cloud Computing-Big Data and Beyond
Kenji Takeda, Microsoft Research

16:15 Parallel Session

- Windows Azure Tutorial
- .NET Gadgeteer Workshop

Wednesday 3 July 2013

17:30 Coach Transfer: Microsoft Research to Selwyn College

free evening

OR

17:30 .NET Gadgeteer Hackathon

Thursday 4 July 2013

09:30 Rough Guide to Being an Entrepreneur
Jack Lang

10:30 Break

11:00 How to Write a Great Research Paper
Simon Peyton Jones, Microsoft Research

12:00 Lunch/Poster Session 3

14:00 How to Give a Great Research Talk
Simon Peyton Jones, Microsoft Research

15:00 Machine Learning: the Future of Computing?
Chris Bishop, Microsoft Research

16:00 DemoFest (including tea and coffee)

17:30 Coach Transfer to Jesus College

18:00 Drinks and Group Photo

19:30 Formal Dinner at Jesus College

22:00 Coach Transfer to Selwyn

Friday 5 July 2013

09:30 Intellectual Property at Microsoft
Pablo Tapia, Microsoft Research
10:30 Break
11:00 How to Present a Poster at an International Conference
Sue Duraikan, Duraikan Training

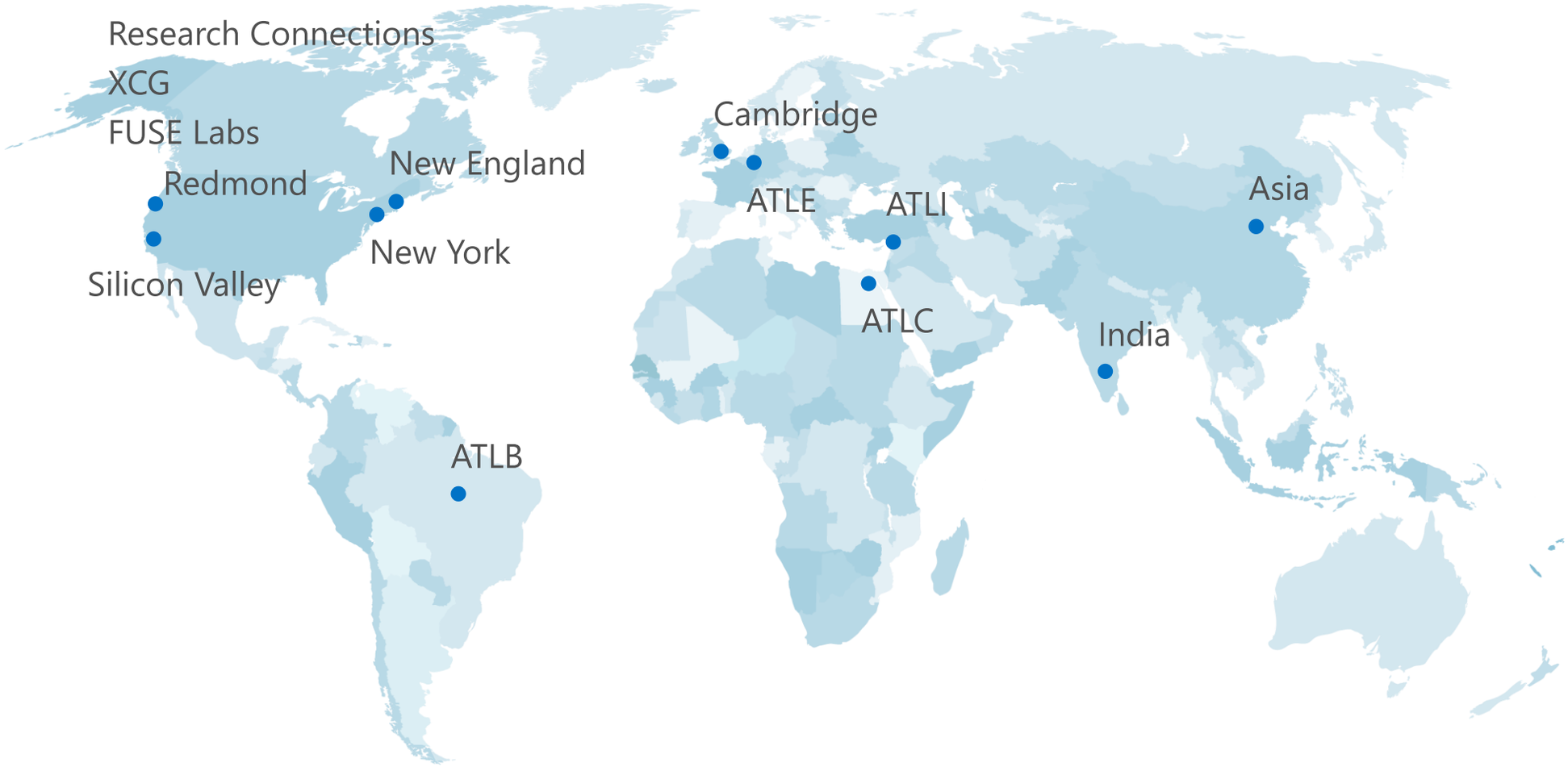
12:00 Coach Transfer to Lunch Venue
12:30 Lunch at Riverside Restaurant
14:30 Coach Transfer to Selwyn College

Learning how to present a poster at an academic conference

Training by Sue Duraikan

- Present your poster to researchers and peers
- General feedback during Sue's talk on Friday
- 1:1 feedback sessions with Sue (Thursday afternoon in parallel to DemoFest)
  → Sign up at helpdesk

Microsoft Research's presence



EMEA (Europe, Middle East, Africa)

Microsoft Research Connections

Microsoft Research Connections (a division of Microsoft Research) collaborates with and supports the work of the world's top academic researchers and institutions.

We establish partnerships to develop technologies that fuel data-intensive scientific research and **advance the state of the art** in computer science and develop technologies that fuel data-intensive scientific research.

By connecting leading researchers around the world, we **aspire to accelerate scientific discoveries and breakthroughs** that respond to some of the world's most urgent global challenges.

Our fellowships, grants, and awards foster **and inspire computer and information scientists** and the **broader research community.**

Imagine.

A world of endless possibilities–dream the unthinkable and change the world forever.

Invent.

Invent a better world–one great idea at a time.

Inspire.

Together, let's inspire the next generation of scientific discoveries.

Microsoft Research
PhD Scholarship

- Started in 2004
- EMEA academics apply with their research project
- Selected projects start in the following academic year
- Students are co-supervised by an MSRC researcher
- Students often do Internships at MSRC
- Around 20 students a year
- Over 220 PhD students in total (~ 100 active)

Microsoft Research PhD Scholarship

PhD Summer School

- Networking
  - PhD Scholars
  - Students from joint research labs (INRIA, BSC, CoSBi)
  - Students from Max Planck Institutes
  - Students sent from ATLs
  - Students sent via Cambridge Computer Lab
  - MSR researchers
- ‘Transferable skills’
  - Write paper or poster, give talk, become an entrepreneur, understand IP laws, …
- Research talks
  - Latest ‘stuff’ from MSR
- MRC projects talks/demo
- Poster sessions
- Social events

The .NET Gadgeteer Platform

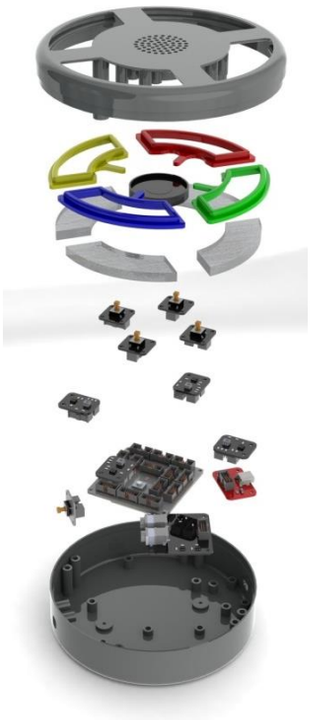
Modular Hardware

Software Tools

```
void ProgramStarted()
{
    // Initialize GTM.Modules an
    myButton = new GTM.Button(GT
    myLed = new GTM.MulticolorLE

    myButton.

    // Do one
    Debug.Pri
}
```

- ButtonPressed
- ButtonReleased
- DebugPrintEnabled
- Equals
- GetHashCode
- GetType
- IsPressed
- ToString

Physical Design



.NET Gadgeteer

What is .NET Gadgeteer?

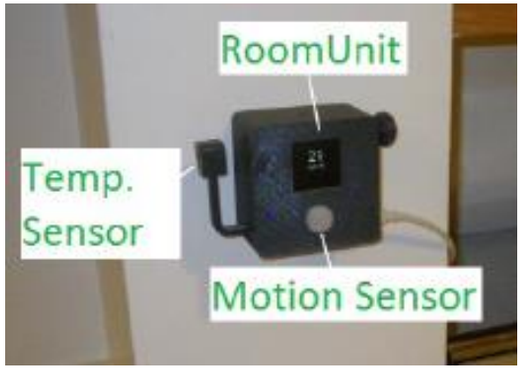
- A rapid prototyping platform for small electronic devices

Characteristics:

- Low threshold
- High ceiling

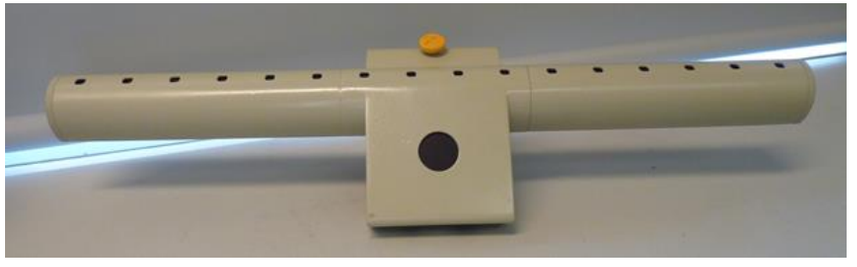
Gadgeteer school projects

MSR Cambridge



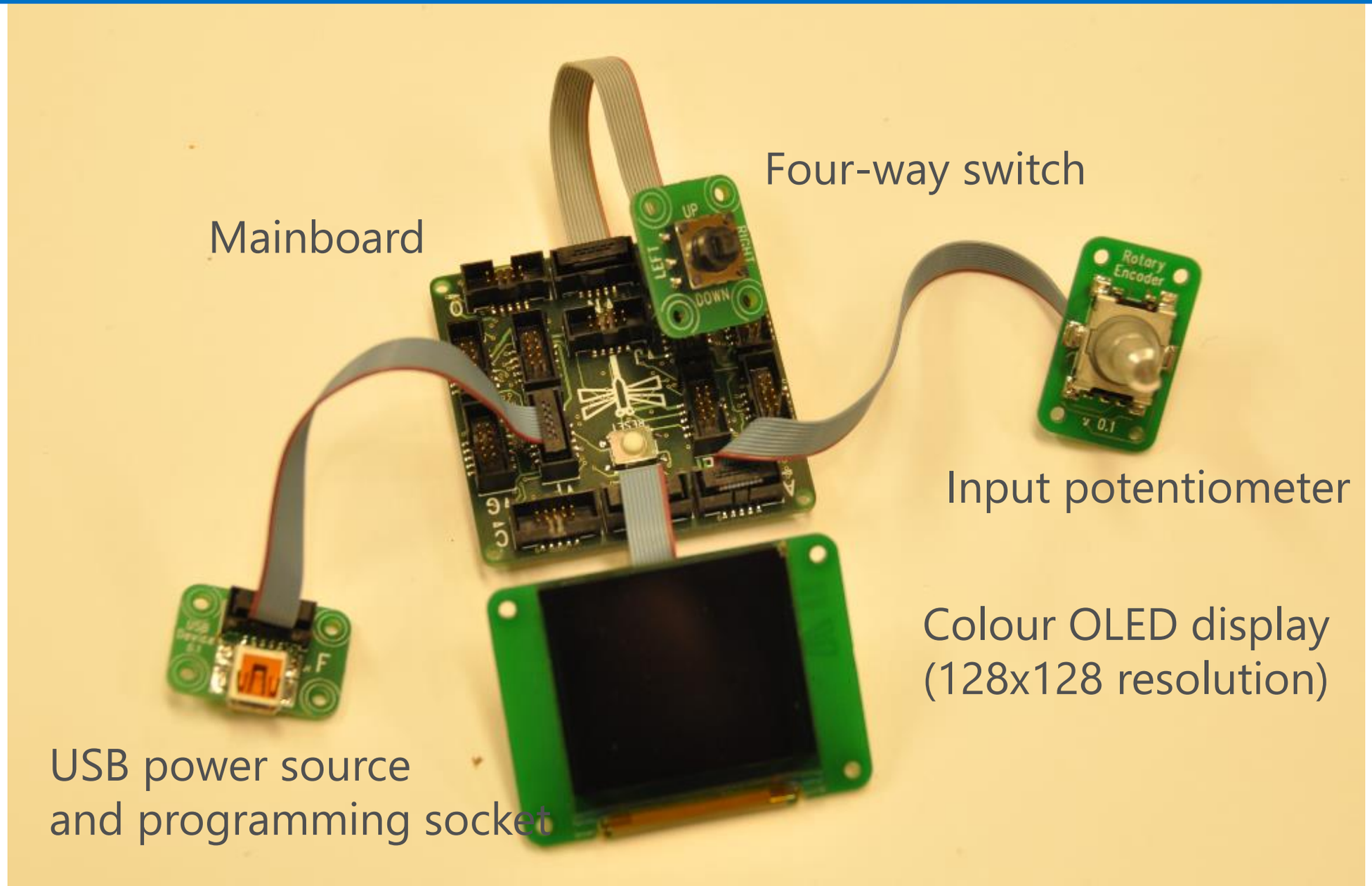
Lancaster

Gadgeteer hobbyist projects



Open University

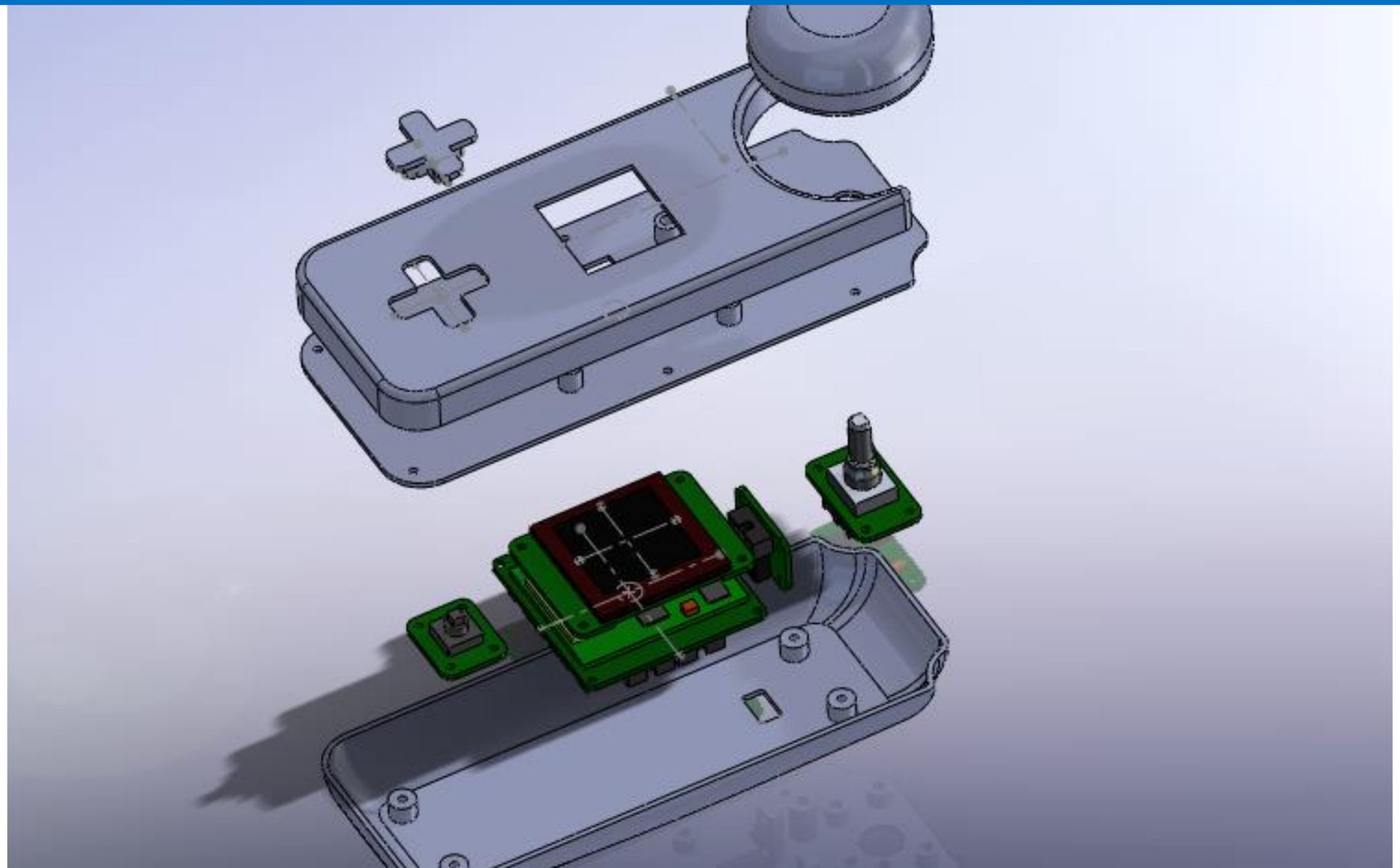
Connect hardware modules (5 minutes)



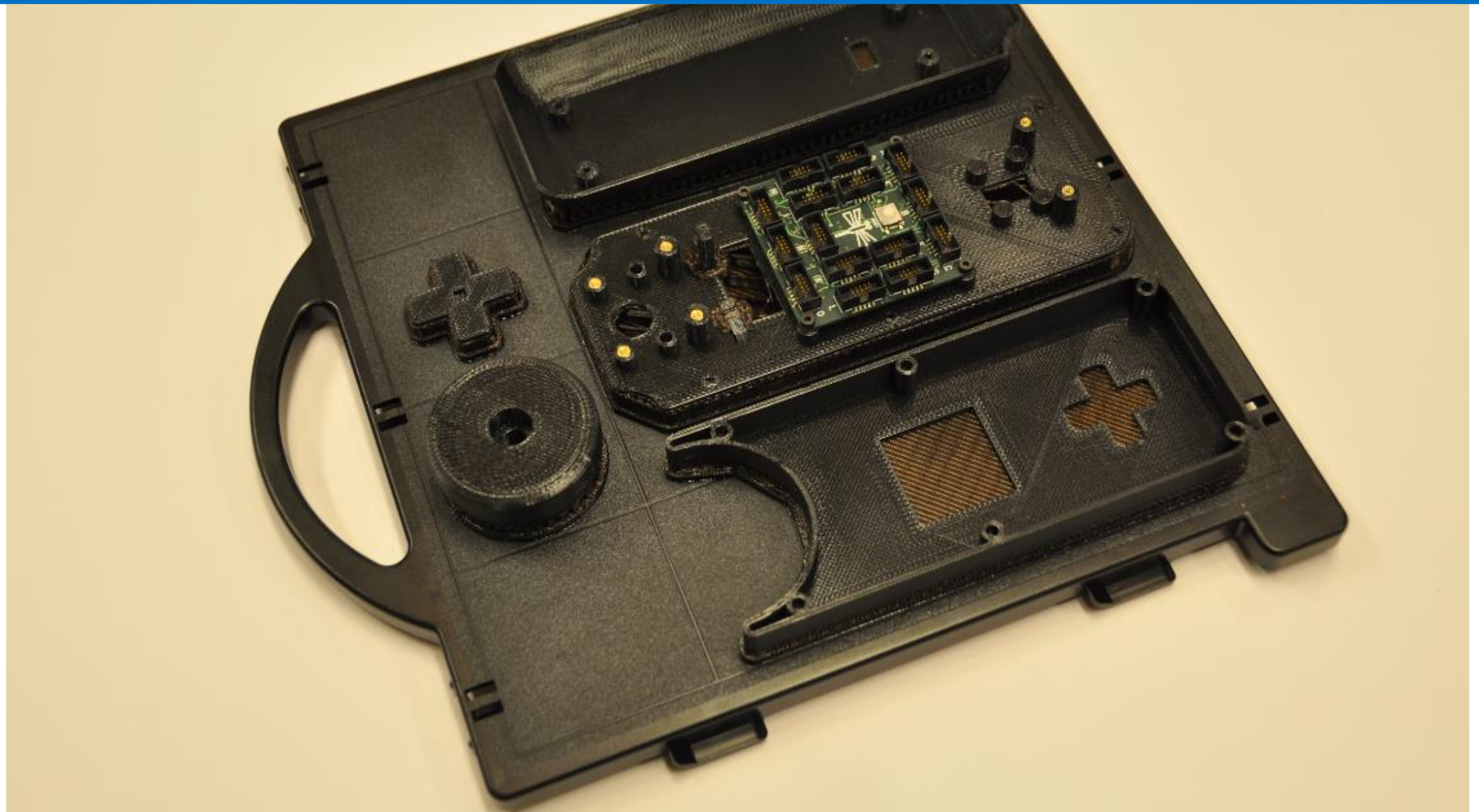
Game development in C# (5 hours)

```
public Point[] positions;
public Point displacement;
public Color color;

public Piece(Point[] positions, Point displacement, Color color)
{
    this.positions = positions;
    this.displacement = displacement;
    this.color = color;
}

public void Rotate(bool clockwise)
{
    for (int i = 0; i < positions.Length; i++)
    {
        Point oldpos = positions[i];
        positions[i].x = clockwise ? -oldpos.y : oldpos.y;
        positions[i].y = clockwise ? oldpos.x : -oldpos.x;
    }
}

public Piece Clone()
{
    Piece clone = new Piece((Point[])positions.Clone(), new Point(displacement.
    return clone;
}
```

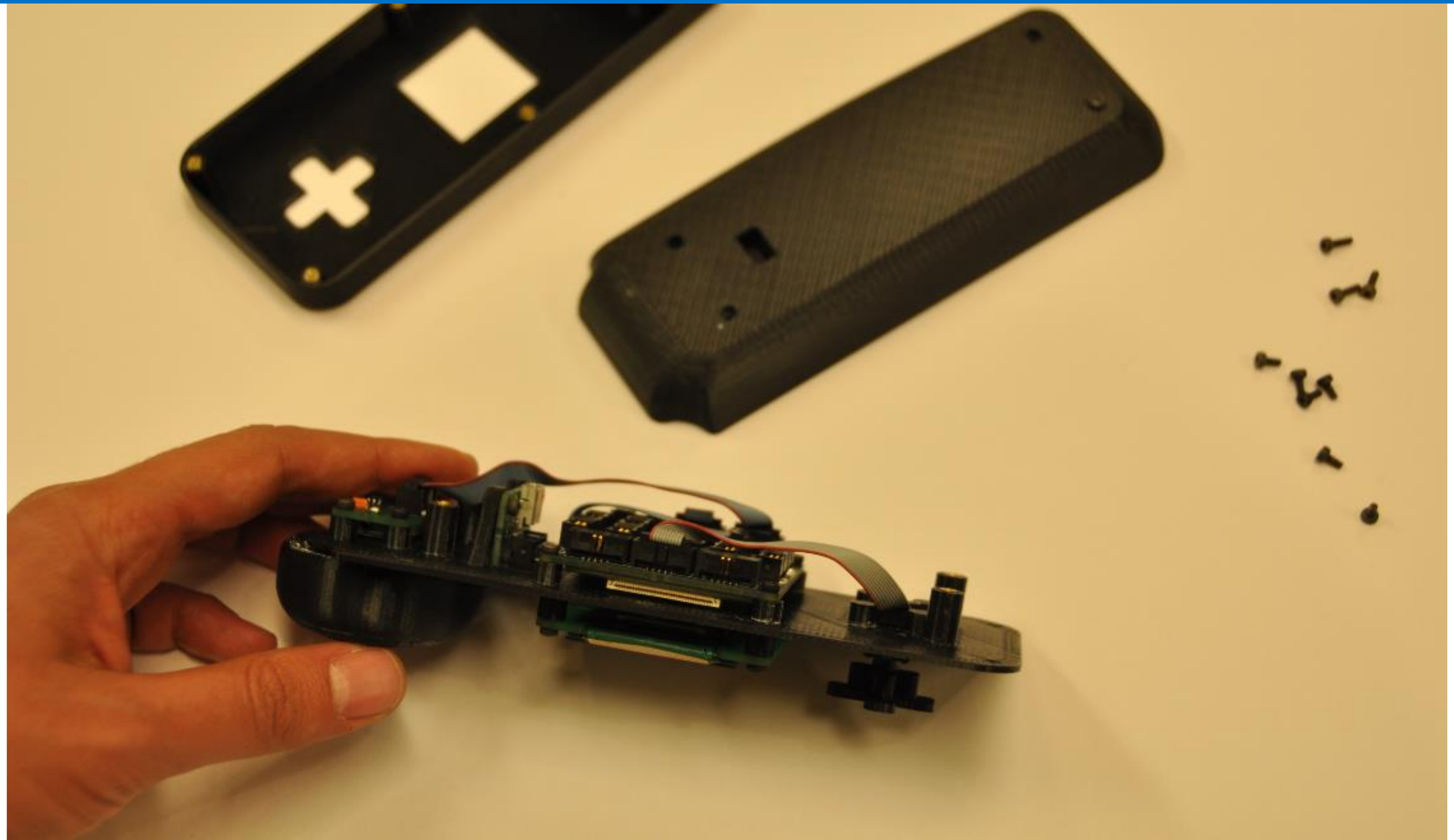
Enclosure design (3 hours)



3D printing (6 hours)



Assembly (20 min)



Summer School activities

- Beginners workshop (Wednesday 4.15pm) –
  learn how to build a simple electronic device
  → Sign up at helpdesk
- Hackathon (Wednesday 5.30pm) –
  learn how to build a simple electronic device and make your own
  → Sign up at helpdesk
- DemoFest (Thursday 4pm) –
  see the platform and selected projects (including Hackathon results)

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Engagement and collaboration focus

Advancing the state of the art in computer science	Accelerating discovery and exploration	Inspire the next generation of computer scientists

Computer Science

Fostering innovative research to advance social and human potential

Natural User Interface

Exploring human-centric ways for people to interact with future computing paradigms

Health and Well-Being

Applying advanced computing technologies to improve health and wellness

Education and Scholarly Communication

Empowering the academic community with innovative tools and technologies

Earth, Energy, and Environment

Accelerating scientific insights that advance our understanding of the natural world

Computer Science

Fostering innovative research to advance social and human potential

Our Computer Science collaboration projects support innovative research on technologies that drive today's computers. Our key areas of focus include software engineering, semantic computing, parallelism and concurrency, programming languages, and mobile computing.

Here are some of our projects:

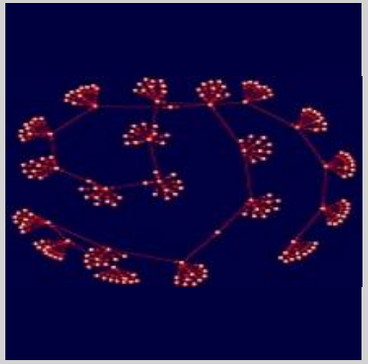
[Cloud-enabled mobile computing]

[Visual Studio research tools]

[Microsoft web n-gram services]

- [Video]
- [Blog]

[Try F#]



[NodeXL: Network graphs for Excel]

Other Research Accelerators can be found on [Microsoft Research Connections].

Natural User Interface

Exploring human-centric ways for people to interact with future computing paradigms

Technology is becoming more natural and intuitive. People already use gesture and speech to interact with their PCs and devices. Such natural ways to interact with technologies make it easier to learn how to operate them. Our Natural User Interface (NUI) collaboration projects focus on facilitating the use of future computer paradigms by keeping the human user in mind.

Here are some of our projects:

KINECT™ for Windows®

[Kinect for Windows]
- [Kinect for Windows home page]
- [Kinect for Windows SDK]
- [Blog]

[Bringing robotics to the surface]
- [Video]
- [Case study] (PDF)
- [Blog]

[Functional contact lens monitors blood sugar without needles]
- [Video]
- [Case study] (PDF)
- [Blog]

Health and Well-Being

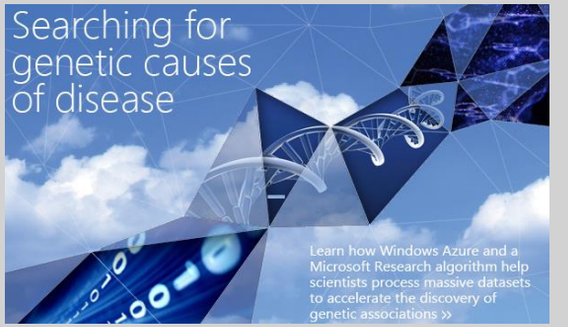
Applying advanced computing technologies to improve health and wellness

We collaborate with academic researchers around the world to develop innovative computing technologies and advance research in human health issues. Our Health and Well-Being collaboration projects apply advanced computing technologies–such as data analysis, imaging, sensor networks, and visualization–to provide insight into disease and human healthcare.

Here are some of our projects:

[Adjusting pneumonia vaccination to save lives]
- [Video]
- [Case study] (PDF)
- [Blog]

[Uncovering new ways the human immune system fights HIV]
- [Video: Seeking solutions in Africa video]
- [Video: The human face of HIV]
- [Case study] (PDF)
- [Blog]



[Supercomputing on demand with Windows Azure]
- [Video]
- [Case study] (PDF)
- [Blog]

Education and Scholarly Communication

Empowering the academic community with innovative tools and technologies

Data collection and analysis, as well as information authoring, publishing, and preservation, are essential components of researchers' daily work. Our Education and Scholarly Communication collaboration projects enhance educational technologies and simplify the scholarly communication lifecycle with software and services that facilitate the coordinated and seamless flow of data and information.

Here are some of our projects:

[ChronoZoom: An infinite canvas in time]
- [Video]
- [Case Study] (PDF)
- [Blog]

[Microsoft Translator Hub]
- [Video]
- [Blog]

[Unified game layer for education]
- [Video]
- [Blog]

Earth, Energy, and Environment

Accelerating scientific insights that advance our understanding of the natural world

Our Earth, Energy, and Environment collaboration projects focus on the development and adoption of technologies for scientific visualization and data management—especially technologies that accelerate insight in the environmental and earth sciences.

Here are some of our projects:

[Layerscape, powered by WorldWide Telescope]
- [Video]
- [Case Study] (PDF)
- [Blog]

[Fighting wildfires with data]
- [Video]
- [Case Study] (PDF)
- [Blog]

[FetchClimate]

Cloud Research Engagement

Helping research communities build scientific tools and data analysis services in the Windows Azure cloud

The Cloud Research Engagement project facilitates and accelerates scholarly and scientific research by enabling researchers to use the power of Windows Azure to perform big data computations in the cloud. We build the components of cloud technology and work with researchers in the field on projects that push the frontier of client and cloud computing.

Here are some of our projects:

[Cloud computing unlocks drug discovery]
- [Case Study] (PDF)
- [Blog]

[Fighting wildfires with data]
- [Video]
- [Case Study] (PDF)
- [Blog]

[Supercomputing on demand with Windows Azure]
- [Video]
- [Case study] (PDF)
- [Blog]

Microsoft Research Connections' Video

How to get started?

To learn more

Microsoft Research: research.microsoft.com
Microsoft Research Connections: research.microsoft.com/connections
Collaboration Opportunities:
http://research.microsoft.com/collaboration-opportunities

Join the conversation

Microsoft Connections Blog: blogs.msdn.com/msr_er/
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