“The future is already here. It’s just unevenly distributed.”

William Gibson
“The future is already here. It’s just unevenly distributed.”

William Gibson
What are the goals for this Digital Technology Seminar?
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1. Provide insight and understanding of digital tools and production technology in the practice of architecture.
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2. Foster discussion and criticism of digital architecture and its impact on the built world.
What are the goals for this Digital Technology Seminar?

1. Provide insight and understanding of digital tools and production technology in the practice of architecture.

2. Foster discussion and criticism of digital architecture and its impact on the built world.

3. Relate the concepts of digital tools and techniques to your studio topic of “Architecture of Integration”
Architecture of Integration - Digital Technology Seminar
- The “Digital Chain” in architecture
- Strategies of intelligent design in a context of scarcity
- Digital tools: communication

- Break -

16h00 - Digital production
- AM resources
- lapa lab resources

17h15 SG 1- Inaugural lecture:
   Prof. Marilyne Andersen - Performance at the service of architecture
Architecture of Integration - Digital Technology Seminar
- The “Digital Chain” in architecture
- Strategies of intelligent design in a context of scarcity.
- Digital tools: communication

- Break -

16h00 - Digital production
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17h15 SG 1- Inaugural lecture: Prof. Marilyne Andersen - Performance at the service of architecture

Friday

09h00 - Benjamin Koren - “1toOne” Architectural Consulting
- Discussion of digital design for projects of scarcity

12h00 – Safety and Security meeting – Rolex Learning Center

- Lunch -

15h00 – Open house: Digital production demonstrations
- AM resources
- lapa lab resources
Why do we have a Digital Technology Seminar?
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- Architects must constantly respond to the changing CONTEXT
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- There is a persistent demand for INNOVATION
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- Architects must constantly respond to the changing CONTEXT
- There is a persistent demand for INNOVATION
- Increasing requirement for EFFICIENCY
- Architects should be involved with the creation and development of their own TOOLS.
- New medium provides CONTINUITY of data within the project
Why do we have a Digital Technology Seminar?

- New medium provides CONTINUITY of data within the project

The digital chain in architecture
The Digital Chain:

Problem and Context data
  > Feasibility Study
  > Schematic Design
  > Detailed Design
  > Production Documents
  > Construction technology
    > Maintenance and operation
      > Renovation + Recycling
      > Demolition
The Digital Chain:

- Problem and Context data
  - Feasibility Study
  - Schematic Design
  - Detailed Design
  - Production Documents
  - Construction technology
  - Maintenance and operation
  - Renovation + Recycling
  - Demolition

Peek & Cloppenburg Department Store
Renzo Piano Building Workshop
Cologne, DE. 2003

Geometry Consultant:
Arnold Walz
The Digital Chain:

Problem and Context data
  > Feasibility Study
  > Schematic Design
  > Detailed Design
  > Production Documents
  > Construction technology
  > Maintenance and operation
    > Renovation + Recycling
    > Demolition
Parametric design, is the creation of topological design – a genetic design – where the relationships between various parts of the geometry are defined, but the actual geometric form is not.
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

**Scarcity:**
The fundamental economic problem of having seemingly unlimited human needs and wants, in a world of limited resources.

Wikipedia - 23.02.11
To do this we should look at some of the issues that you can play with for your design:

1. Function
2. Context
3. Materials
4. Structure
5. Geometry
6. Time
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. Function
   - What are you trying to accomplish (brief) and how can you “multi-task” program and design to accomplish these goals.
   - Design for flexibility – repurposing, reuse, and recycling
   - Determine the “true” life expectancy of your design.
To do this we should look at some of the issues that you can play with for your design:

1. Function
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

2. Context

- Consider your site as one of the building elements – how can you most constructively use your existing site?
- Respect the local climate and environment and consider the long term costs of operating and maintaining the construct.
- “Context” extends to knowing local practices of building and special knowledge or industry.
Digital Technology Seminar

Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. Function

Guggenheim Bilbao, Gerhy + Partners : CATIA
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

3. Materials
   - Source locally used and made materials.
   - Standardization – use small simple creative interventions to best effect.
   - Develop projects that use conventional materials in innovative ways
   - The least expensive architectural effect is colour (paint).
Digital Technology Seminar

Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. Function

Research Pavilion ICD/ITKE University of Stuttgart
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

4. Structure

- Lightweight = less structure = less cost.
- Try to use materials multifunctionally
- Consider existing structural or component systems mixed with your own invention
Laneway House, Toronto: Jeffrey Stinson
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

5. Geometry

- Know the limits of local materials and work-skill – and use this to constrain the complexity of the design.

- Go back to geometrical basics – if you need to have irregular form, then investigate rationalization issues to find the “best” simplified form that still meets your design needs.

- Once you have a basic functional design – see if there is a possibility for expressive effects - with minimal means.
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. Function

Aqua Tower, Chicago : Studio Gang
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

6. Time

- Labour and construction time is one of the largest costs in a building project – if it can be reduced the project is efficient.

- Balance between on-site construction and off-site pre-fab components.

- The sooner the building is in use – the better return for the clients and inhabitants.
Digital Technology Seminar

Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. Function

The Container Home - Adam Kalkin
Digital Tools as efficiency drivers – Designing in a context of SCARCITY.

To do this we should look at some of the issues that you can play with for your design:

1. **Function** – Design Intelligence and use of tools to simulate usage over time.
2. **Context** – GIS Data, Terrain modelling, Environmental simulation, local industry working methods.
3. **Materials** – CAD/CAM processing and fabrication, analysis and simulation, visualization.
4. **Structure** – Structural and engineering analysis, CAD/CAM fabrication, construction logistics.
5. **Geometry** – Parametric programming, analysis, optimization and rationalization scripts.
6. **Time** – construction logistics, prefabrication modeling, communication.
Digital Tools

- Clear relation to issues of standardization and modularization
- Ability for customization within the process by employing parametric programming.
- Ability for automation of documentation and construction process.
- Engagement of industrial processes can “facilitate” the fabrication and construction.
- Communication is one of the main digital tools for architecture.
Digital Tools: Communications
Digital Tools: Communications
Digital Tools: Communications

- E-mail
- Web
- Internet + FTP
- Video conferencing
Digital Tools: Communications

- E-mail
- Web
- Internet + FTP
- Video conferencing
- Video explanations
Digital Tools: Communications

- E-mail
- Web
- Internet + FTP
- Video conferencing
- Video explanations
- On-line collaboration
- BIM - Building Information Modeling
Digital Tools: Communications

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- Web
- Internet + FTP
- Video conferencing
- Video explanations
- On-line collaboration
- BIM - Building Information Modeling
- 3D PDF
Digital Tools: Communications

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- Web
- Internet + FTP
- Video conferencing
- Video explanations
- On-line collaboration
- BIM - Building Information Modeling
- 3D PDF
- Google Earth + models
lapa dts

Digital Tools: Fabrication

- Break -
Digital Tools: Fabrication

Additive Fabrication and Equipment in the Atelier de Maquettes - Mitch Heynick

Reductive Fabrication and Equipment in the lapa lab - Russell Loveridge
Digital Tools: Fabrication

Reductive Fabrication - Cutting (2D)

Laser cutting

Plasma Arc Cutting

Water Jet Cutting
Digital Tools: Fabrication

Reductive Fabrication – Turning (2.5D)

CNC Lathe

Cutting with rotary attachments
Digital Tools: Fabrication

Reductive Fabrication: Routing (3D)

CNC Milling
17h00 Inaugural Lecture – Prof. Marilyne Andersen
EPFL - SG 1 Performance at the service of architecture

Tomorrow in the DTS:

09:00 – AAC108 - Benjamin Koren : 1toOne
• Digital programming and fabrication consultant
• Project and technology discussion

12:15 - Safety and Security meeting for all students - Rolex Learning Center Forum

15:00 ~Demonstrations
- lapa lab
- Atelier de Maquettes