

Welcome to ADD Basics!

—

We'll start at 15:15

A''

Aalto-yliopisto
Aalto-universitetet
Aalto University



Today's agenda

15:15 Course introduction (Meri)

16:00 Break

16:10 Project showcase: PDP team Ambrocio

16:20 Introduction to digital design and fabrication technologies (Aaro)

17:30 Ideation & homework exercise (Meri)

**What is additive manufacturing?
What do we use it for?**

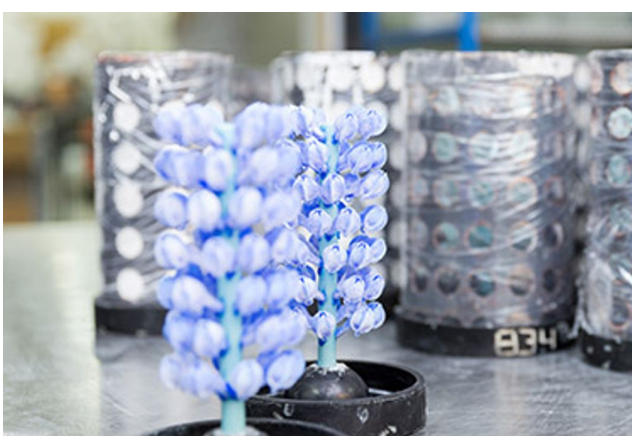


**How It's
Made**



Snow Flower

The snow flower springs up from under the snow and ice to celebrate the diversity of nature, creating light and beauty around it.



Kalevala.fi



So what will we study on this course?

After the course, the student is able to understand the basics of additive manufacturing.

After the course, the student is able to ideate and evaluate applications for additive manufacturing from the perspectives of design, business and engineering.

After the course, the student is able to apply digital design and/or manufacturing to prototype and pitch a product or service.

After the course, the student is able to use their own experience/disciplinary knowledge in solving multidisciplinary problems in a teamwork setting.

On this course, you will hear various points of view on additive manufacturing and its applications



Meri Kuikka
Aalto Design Factory &
Aalto Ventures program



Aaro Packalén
Aalto Design Factory



Hector Velasquez
Reynoso
Väre 3D printshop



Anders Häggman
Aalto Design Factory &
Aivan



Teppo Vienamo
Aalto Design Factory &
Aalto ARTS



Jouni Partanen
Aalto ENG



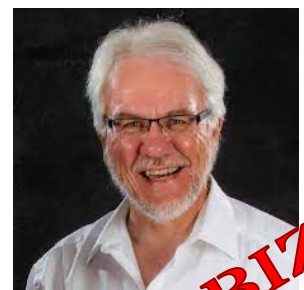
Wycliffe Raduma
Research to Business &
Hyperion Robotics



Elina Kähkönen
Aalto Design Factory,
Aalto co-educators



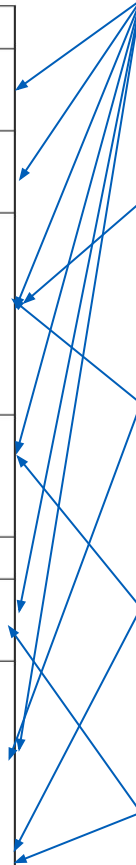
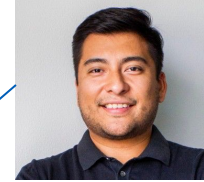
Sonja Hilavuo
Aalto Ventures Program



Håkan Mitts
Aalto co-educators

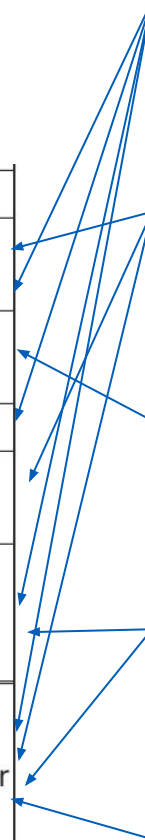
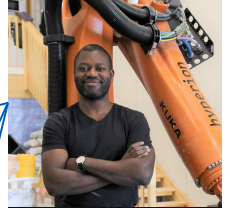
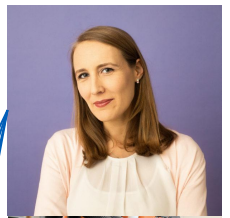
Course schedule

Date	Topic	Speakers	Location
29.2.	Course introduction, ideation Digital design & fabrication technologies	Meri Kuikka Aaro Packalén	K3 Stage
7.3.	Ideation & group division Applications of additive manufacturing	Meri Kuikka Aaro Packalén	K3 Stage
14.3.	Print workshop tutorial Design for AM part 1: Materials Critically evaluating product ideas	Hector Velasquez Reynoso Aaro Packalén Sonja Hilavuo Meri Kuikka	Väre Q202 / Q203 / Väre 3D Print workshop
21.3.	Prototyping in practice	Meri Kuikka Anders Häggman Teppo Vienamo	K3 Stage / Meadow
28.3.	Easter		no class
4.4.	Sustainability in additive manufacturing Design for AM part 2: Manufacturing technology	Elina Kähkönen Aaro Packalén	K3 Stage
11.4.	Halfway checkpoint: Learning café	Meri Kuikka Teppo Vienamo Elina Kähkönen Anders Häggman Sonja Hilavuo Aaro Packalén	K3 Juniper



Course schedule

18.4.	Exam week		No class
25.4.	TBA	Meri Kuikka Wycliffe Raduma	K3 Juniper
2.5.	Entrepreneurship game	Meri Kuikka Håkan Mitts	K3 Stage
9.5.	Ascencion day		no class
16.5.	Preparing to present your idea Using AM to optimise the supply chain	Meri Kuikka Wycliffe Raduma	K3, Juniper
23.5.	Possibilities of 3D printing Presentation feedback	Jouni Partanen	K3, Stage
30.5.	Dragon's Den presentations	Meri Kuikka Wycliffe Raduma Jouni Partanen Anders Häggman	K3, Stage/Juniper



We'll explore some new spaces

- Apply for access to “Design Factory General + Prototyping 24/7” via idm.aalto.fi if you want to enter K3 after 15:30
- Get access to Väre 3D after completing assignment 3



A! Aalto University One Identity Manager

Home Request Attestation Responsibilities

Request

Service items in the category: Physical access to special zones

design factory

Index search: "design factory" ✕

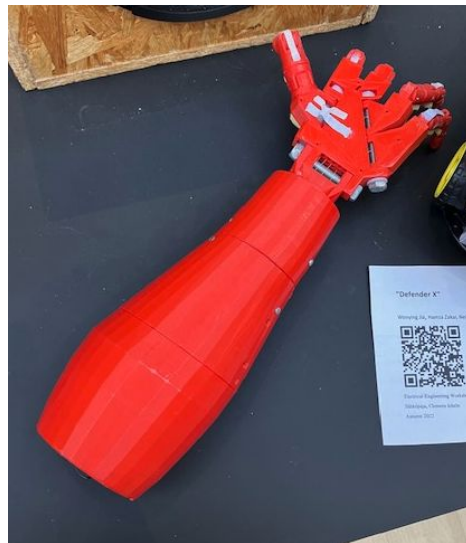
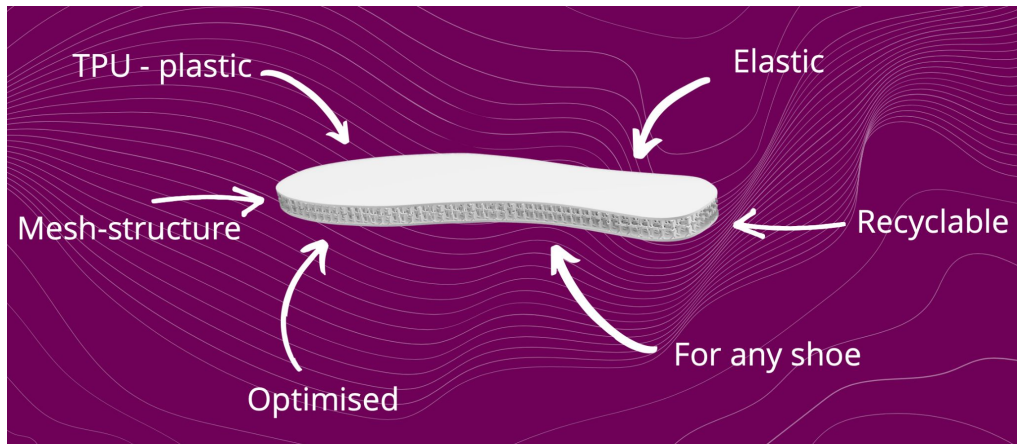
<input type="checkbox"/>	Product	Service category
<input checked="" type="checkbox"/>	Puumiehenkuja 5 K3 Design Factory General+Prototyping 24/7	Physical access to special zones



Final assignment: Dragon's den

- Pitch presentation of your course project
- Each weekly assignment is designed to help you move towards the final pitch: ideating, prototyping, printing, gathering feedback from users, iterating





Assessment for learning

Course grading is based on a mix of formative and summative assessment.

Formative assessment methods:

- **Weekly assignments (pass/fail), 25%**
- **Questioning, feedback, peer assessment and self-assessment, 15%**
- **Formative assessment can also be used to adjust your entire course grade (for example to give credit where due in groupwork)**

Summative methods:

- **Halfway checkpoint (1-5 grading), 25%**
- **Final pitch assignment (1-5 grading), 35%**

%	Grade
86-100	5
70-85	4
60-69	3
50-59	2
40-49	1
<40	Fail

Add Basics: what would you like to learn on this course?

Write down 3 separate learning objectives for yourself. What topics or skills would you like to learn about during this course? We'll do our best to incorporate your preferences into the course plan.



tinyurl.com/mvbs2huk

1. During this course, I would like to learn...

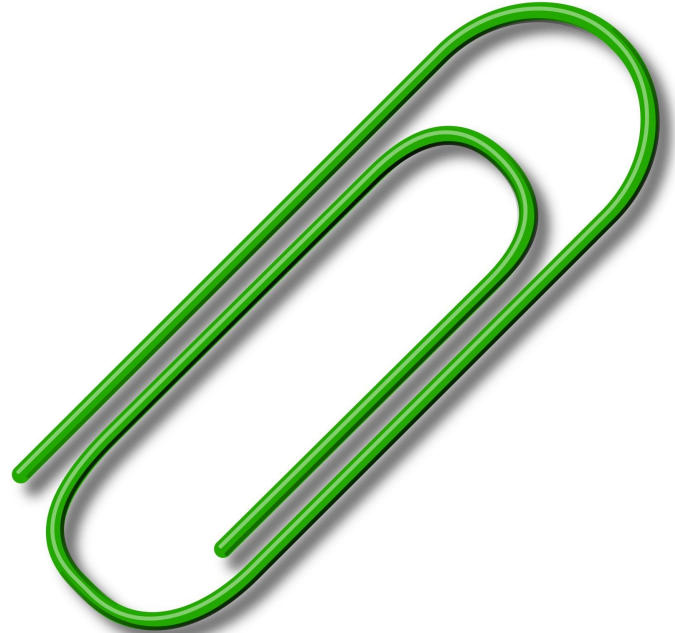
Enter your answer

Break

A few words on coming up with ideas + assignment 1

Let's get started!

- Make a numbered list of as many creative uses for a paperclip as you can
- Quantity over quality



02:00

How many did you come up with?

Did you come up with any of these?



How about these?

- melt and use as material
- exchange for something else
- sell

Divergent thinking is a thought process used to generate creative ideas by exploring many possible solutions.

1. Quantity over quality
2. Defer judgement
3. Seek the wild and unusual
4. Build on other ideas

Let's practise **divergent thinking**

Consider opportunities for 3D-printed products you've seen.

Look at the image displayed on the screen. Does it trigger memories or analogies to something that could work?

For 90 seconds per image, record ideas on the paper in front of you.



<https://randomwordgenerator.com/>



01:30





01:30

<https://randomwordgenerator.com/>

Share and discuss

Choose one idea to explain to the person sitting next to you (2 min each).

Explain how the image inspired the idea.



We've tried **2 techniques**, here are a few more

1. **Brainstorming**

2. Reverse Brainstorming
3. Starbursting
4. The Charette Procedure
5. Crawford slip writing method
6. Round-robin brainstorming
7. Rolestorming
8. Role-play
9. Electronic Brainstorming
10. Brainwriting
11. 6-3-5
12. Pool method
13. Idea card (pin card) method
14. Post-Up
15. Constrained brainwriting
16. Electronic Brainwriting
17. The spreadsheet technique
18. Interactive brainwriting
19. Brainwriting game
20. Metaphorical thinking
21. Reversal
22. SCAMPER
23. Attribute listing
24. Morphological analysis
25. Matrix analysis
26. Six thinking hats
27. Po (Provocation)
28. Talking pictures
29. The list of 100
30. Listing
31. Heuristic ideation technique (HIT)
32. Design Heuristics
33. TRIZ
34. C-Sketch
35. Concept generating matrix
- 12 c 2020 by ASME
36. Ideation session
37. SDI
38. Laddering
39. Synectics
40. Delphi Method
41. SIT
42. Concrete stimuli
43. Forced analogy
44. Gallery
45. Passive searching
46. Storyboarding
47. Braindrawing
48. Brain sketching
49. Nominal Group Technique
50. Bodystorming
51. Assumption Busting
52. Brainmapping
53. Challenge
54. Essence
55. Forced Conflict
56. How-How Diagram
57. How to
58. The Kipling method
59. Lotus Blossom
60. Chunking
61. Mind-mapping
62. PSI
63. **Random Words/Images**
64. Remembrance
65. Rubber-ducking
66. Take a break
67. Pause
68. Greetings cards
69. Unfolding
70. Value Engineering
71. Wishing
72. Concept metaphors and analogies
73. Ideation game
74. Word tree design by analogy
75. Forward steps
76. Backward steps

Kirjavainen, Senni & Hölttä-Otto, Katja. (2021). Deconstruction of idea generation methods into a framework of creativity mechanisms. Journal of Mechanical Design 143.3

Summary: why do product designers practise ideation?

- In a competitive market, it's not enough to design products/services that are purely functional¹
- Products/services that meet user needs and have unique features are more likely to succeed than those that don't²

How can we get ideas worth pursuing?

- In innovation, quantity leads to quality
- Creativity is a skill that improves with practice³



[1] Kahn, Kenneth B., 2005. *The PDMA Handbook of New Product Development*, 2nd ed. Hoboken, NJ: John Wiley.

[2] Cooper, R.G., 2013. *New products: What separates the winners from the losers and what drives success. PDMA handbook of new product development*, pp.3-34.

[3] Claxton, Guy, and Bill Lucas. *New Kinds of Smart: How the Science of Learnable Intelligence Is Changing Education*. McGraw-Hill Education, 2010.

Want to know more about ideation in design work?

Idea generation techniques:

Smith, G. F. (1998). Idea-generation techniques: A formulary of active ingredients. The Journal of Creative Behavior, 32(2), 107-134.

Ideation techniques in design work:

Laakso, M., & Liikkanen, L. A. (2012). Dubious role of formal creativity techniques in professional design. In DS 73-1 Proceedings of the 2nd International Conference on Design Creativity Volume 1 (pp. 55-64).

Idea generation methods:

Kirjavainen, Senni & Hölttä-Otto, Katja. (2020). Deconstruction of idea generation methods into a framework of creativity mechanisms.

Assignment 1

Kick off the creative process. Start preparing and paying attention. Consider what opportunities there might be for utilization of 3d printed products around you (or in any context).

- 1. Record ideas, opportunities, observations. At least [three per day](#) (21 in total by next session).**
 - It is best if this happens in real time during the day, but if not, take a moment to reflect at the end of the day to think about what you have done, seen, encountered or talked about during the day.
 - How does that relate to something that is 3d printed? Are there needs or opportunities there?
 - Record in any format; notebook, phone, tablet...

Upload your notes to mycourses, and bring your ideas [to the next session](#). They will be used as basis of ideation in groups (so make sure to bring yours, but don't get too attached to them). It is good to reflect beforehand which of your ideas/opportunities you find most interesting and potentially useful.

22. – 24.03.



Solve the SDGs is a 48-hour hackathon on two continents for one purpose: *creating solutions to real sustainability challenges provided by our partner organizations.* ⚡ 🦩 🌍

Work together with global talent and expert mentors, build something that will make the world a better place, and compete for a main prize of 5000€.

You can also earn 1 credit for attending! ;)

**Apply by Friday 8.3. to join:
solvethesdgs.com**

