2009

London Program 2009 Part 1

Xavier De Kestelier

Jethro Hon

SYRACUSE ARCHITECTURE

London Program 2009

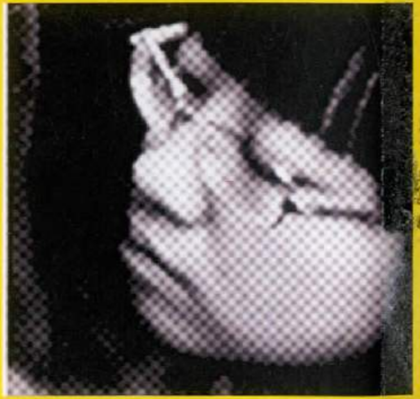
Xavier De Kestelier
Jethro Hon















Members

(starting from top, reading left to right)

Jethro Hon
Xavier De Kestelier
Nate Wooten
Jay Campbell
Ed Dudley
John Albert Denapoli
Jose Manuel
Kristen Melton
Kervin Brisseaux
Neysha Mejia
Kyung Eun Lee
Marcos Maldonaldo Rigau
Claire Mo
Chetan Gowder Basavaraj
Erwin Riefkohl

Amplification of Technology

Design Studio, London, 2009

Amplification of Technology is a 2-phased, 15-week programme designed to explore the disciplines of functional design, material science, software/hardware technologies, construction assembly and manufacturing techniques. Rapid prototyping & manufacturing processes will become a primary focus in understanding, evaluating and approaching performance-driven design. Shaped as a collaborative research effort, strategically formed specialist groups will focus on R&D of various design components within a larger conceptual framework. Each group contributes to the success of the research at large. This acquired field of 'expertise' allows for research topics to endeavour new opportunistic approaches to current manufacturing techniques and new adaptability of existing designs and technologies. Biased towards an iterative and construction parallel approach, Off-the-shelf and performance-specific developed design tools help to evaluate and optimize iterative mock-ups of conceptual & functional components.

Phase I, which spans the first four weeks of the semester, introduces ideas of component design, usability and re-engineering of mass-customized industrial parts. A challenge set by careful evaluation of an industrial manufactured part and its limitations will allow participants to challenge its existing functionality and limitations for bringing a more integrative solution in question.

Phase II begins an in-depth investigation upon earlier developments, allowing specialist groups to accelerate and develop strategically piloted opportunities and new functionality into working prototypes.

We think of design as an integrative environment which works in parallel with the current technological developments. These interventions should exceed their pure formal qualities. We are not so much interested in the pure technical and formal capabilities of computational design and digital fabrication. Design itself is central and technology is a tool within the design process. Technology is not thought of as a fetish, but implemented in a way which is seamless with the design.

Amplication of Technology

Innovation in architecture and design is often preceded by technological advances. In the last decade we have seen a surge in digitisation of architecture in education and practise. It was in the mid nineties that architects started to fully embrace digital tools, by borrowing techniques and software from the animation and gaming industries. 10 years onwards, and not a single architect graduates without knowing what a B-spline surface is.

A lot of the architectural design and discourse has been happening within the digital world without testing these concepts in the real (physical) world.

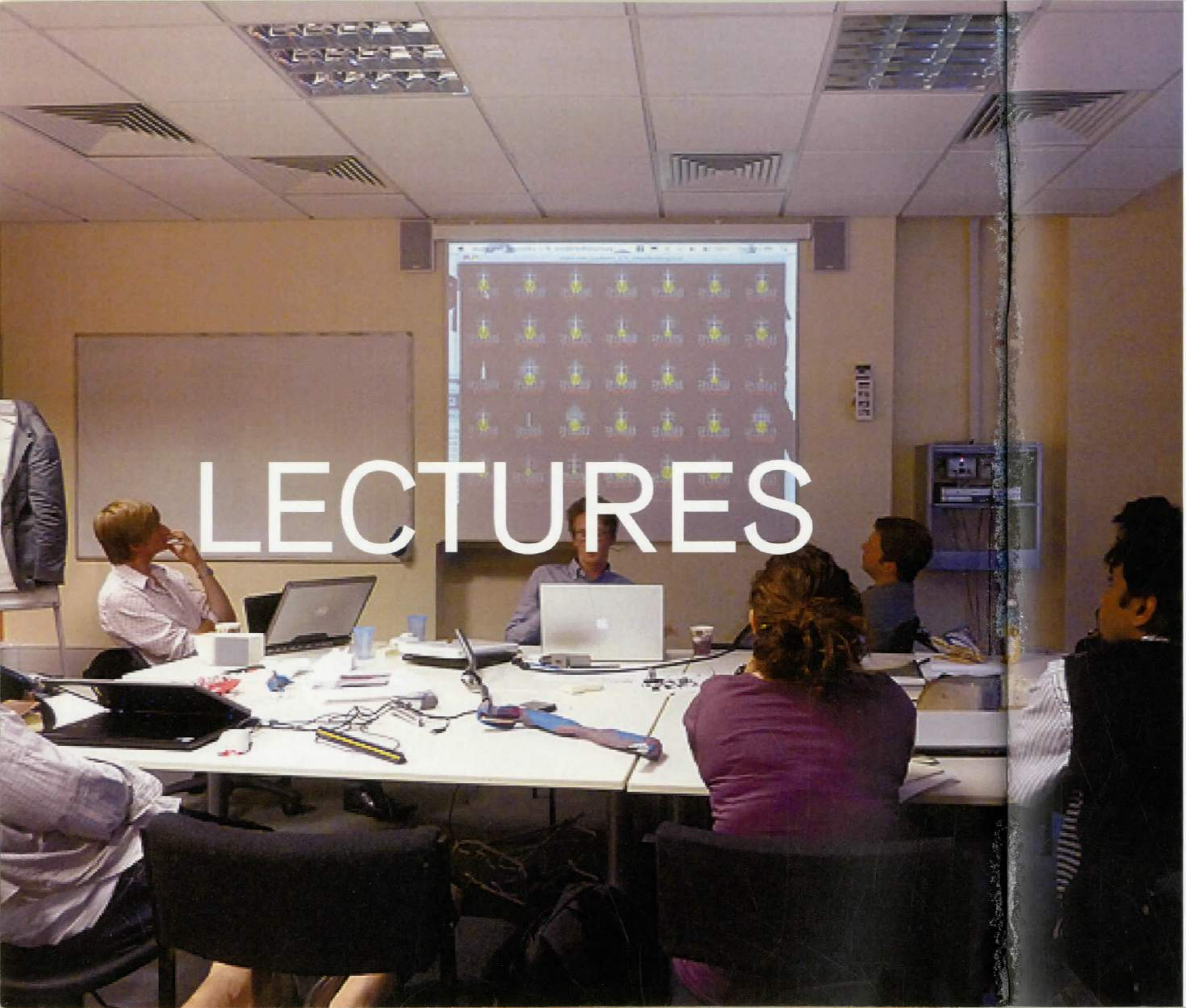
A second technological advance that is changing architecture is the implementation of digital fabrication and rapid prototyping. These technologies have enabled testing and validation of the digital architecture that was so easily created in the virtual, by directly linking the design software with these digital fabrication tools. Complex geometrical architecture can be realised in a scale model or prototype

We feel there is a third, and probably the most profound shift in the digitisation of architecture. It is only by testing architecture on a "one to one" scale that the true complexity and intricacy of the design can be resolved and expressed. The direct link between digital design and fabrication is becoming a reality. It is in this realm, where the digital is directly connected to the real, that we like to operate.

PECHA KUCHA

To start off the SULondon Studio, each of the students were asked to prepare a Pecha Kucha style presentation. This presentation had to reflect their own background from a cultural and architectural perspective. The students were encouraged to show their own architectural work, but even more important , they were encouraged to express other interests they have besides architecture. Besides the students, the tutors al so gave a personal Pecha Kucha as well. In tht way, within an hour evryone started to get a good idea of the interests and the skills within the studio.

<PechaKucha Night was devised in Tokyo in February 2003 as an event for young designers to meet, network, and show their work in public.
It has turned into a massive celebration, with events happening in hundreds of cities around the world, inspiring creatives worldwide. Drawing its name from the Japanese term for the sound of "chit chat", it rests on a presentation format that is based on a simple idea: 20 images x 20 seconds. It's a format that makes presentations concise, and keeps things moving at a rapid pace.>



Lectures

Topological Optimisation
Sam Joyce (SMART, Buro Happold)

Louvre Abu Dhabi
Al Fisher (SMART, Buro Happold)

Design Research with Customised CNC Devices
Marta Male-Alemany (Architectural Association)

D-Shape: MegaSCALE Printing for Construction
Enrico Dini (D-Shape)

1 - Foster + Partners: Project "Christmas Tree"
2 - RP & RM for Architecture
3 - Digital Fabrication
Xavier De Kestelier (Foster + Partners)

How Nature Integrate Processes
Dr. Rupert Soar (Freeform Engineering)

Mega-Scale Concrete Printing
Dr. Richard Buswell (Loughborough University)

Optimisation & Fabrication
Jalal El Ali (Generative Geometry Group, Buro Happold)

FACIT: CNC Low-Cost Housing
Bruce Bell (FACIT UK)

CRITICS

Guest Critics

Jalal El-Ali
Generative Geometry Group, Buro Happold

Mirco Becker
Senior Associate Principle, KPF

Nicholas Boyarsky
Boyarsky Murphy Architects

Phillipe Brysse
Mad Architecture

Joris Pauwels
Zaha Hadid Architects

Mark Robbins
Dean, Syracuse University School of Architecture

Brady Peters
CITA

Camiel Weijenberg
Zaha Hadid Architects

Hugh Whitehead
Specialist Modelling Group, Foster + Partners

Field Visits

Architectural Association
DRL Studio Visit

Digital Hinterlands
Exhibition on Digital Architectural Design

Pestival Pavilion
100/1 Digital Fabricated Termite Pavilion

Metropolitan Works
Workshop introduction and tour of digital fabrication facilities

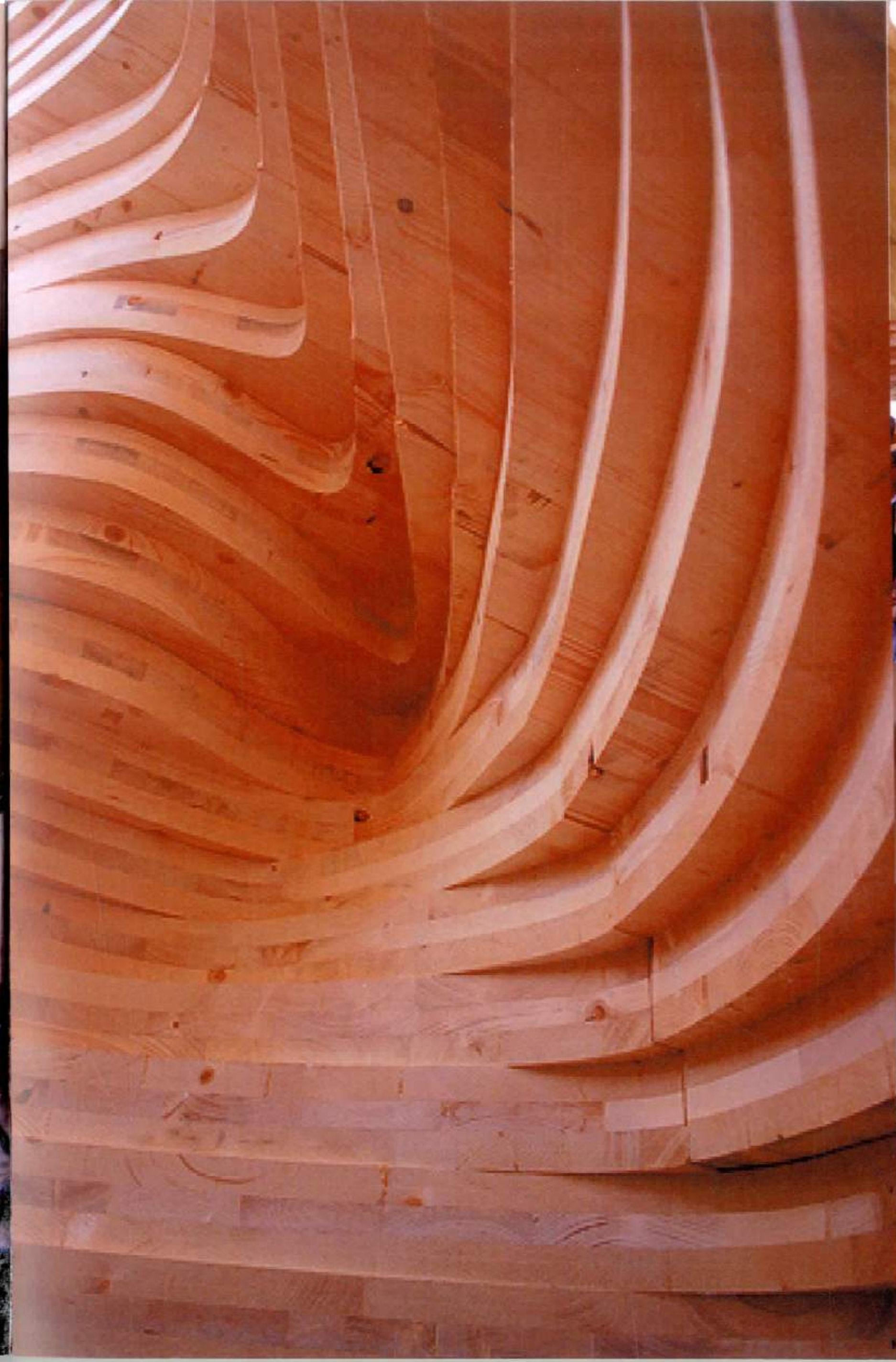
Loughborough University
Department of Rapid Prototyping and Manufacturing

UntoThisLast
Dgital Fabrication of Furniture

Foster+Partners
Office Tour

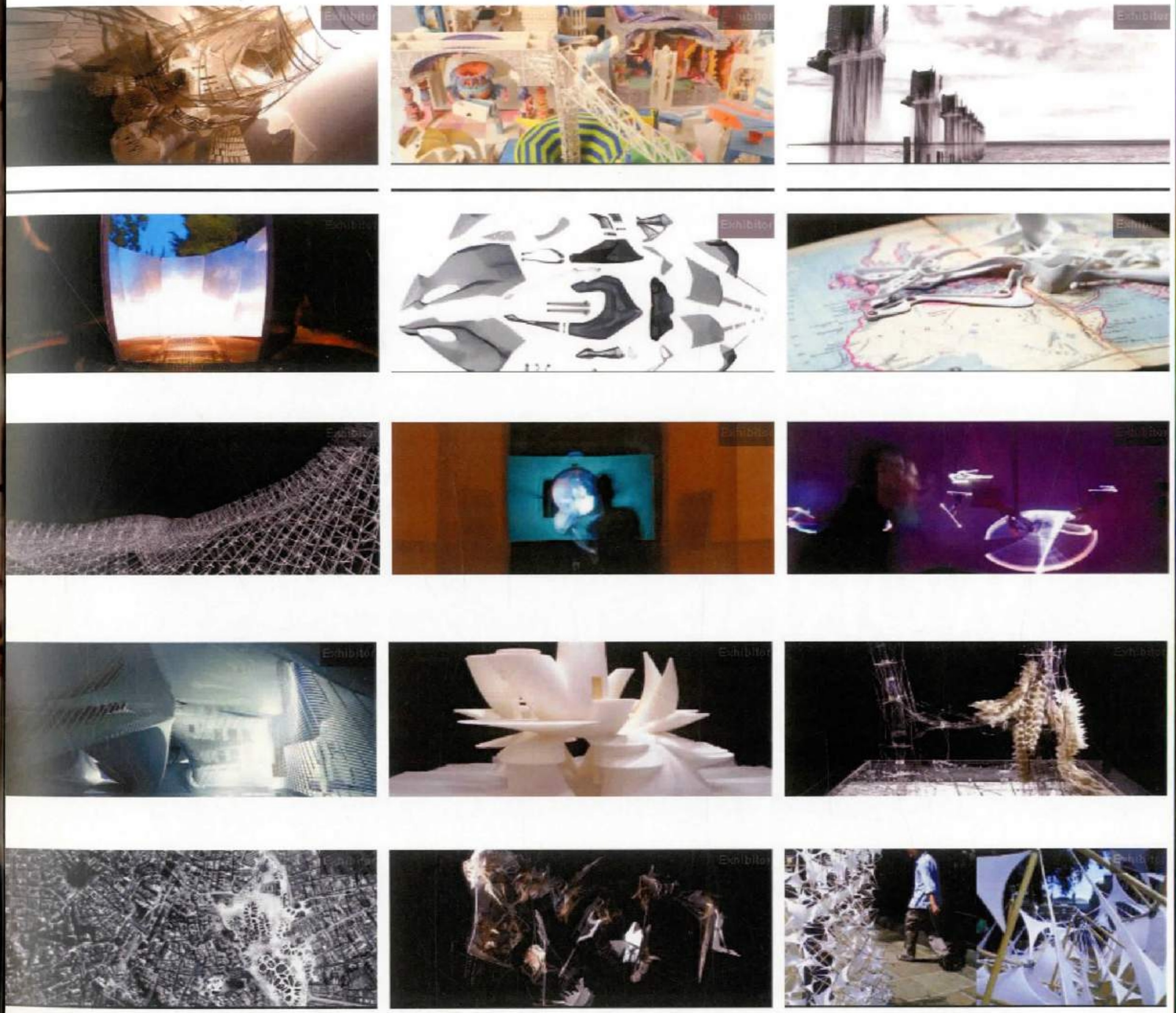
London Architecture:
Tour of British Museum, Millenium Bridge, Swiss Re, Lime Street, GLA , More London Masterplan and Albion Wharf

1 - PESTIVAL



2 - UNTOTHISLAST

3 - DIGITAL HINTERLANDS EXHIBITION



4 - METROPOLITAN WORKS

5 - ARCHITECTURAL ASSOCIATION

6 - LOUGHBOROUGH UNIVERSITY

7 - OFFICE TOUR FOSTER+PARTNERS

8 - LONDON ARCHITECTURE TOUR

London Architecture Tour:

British Museum

Millenium Bridge

Lloyds

Swiss Re

Lime Street

Greater London Authority Building

More London Masterplan

Albion Wharf

DIGITAL ARCHITECTURE LONDON

CONFERENCE MONDAY 21ST SEPTEMBER 2009

Venue: The Building Center
Store Street, London WC1E 7BT

interactive
architecture.org

THE BUILDING CENTRE

AA

UCL

LONDON
DIGITAL
WEEK

Ruairi Glynn
Alan Penn
Geoff Manaugh
Murray Fraser
Neil Spiller
Rachel Armstrong
Tony Dunne
Marcos Cruz
Rachel Wingfield
Brett Steele
Patrik Schumacher
Marjan Colletti
Alvin Huang
Daniel Bosia
Usman Haque
Matt Webb
Tobi Schneidler
Stephen Gage
Bob Sheil
Hanif Kara
Charles Walker
Michael Stacey
Ruairi Glynn
Alan Penn
Geoff Manaugh
Murray Fraser

FABRICATION TECHNOLOGIES

The Syracuse London Program is a relative small program and there fore it does not have any digital fabrication technology. Therefore it the students were able to use digital fabrication technology from Metropolitan Works.

Metropolitan Works' Digital Manufacturing Centre houses a broad range of digital manufacturing equipment. It is a "factory in the city" where creative practitioners from all disciplines can explore the potential of formerly inaccessible industrial technology to develop their ideas through experimentation, rapid prototyping and production. The following technologies were available for the students:

Selective Laser Sintering

Stereo Lithography

3/5 axis CNC milling

Laser cutting

Waterjet cutting

3D printing



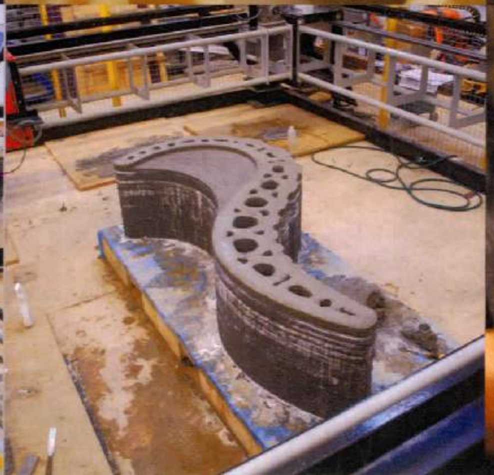


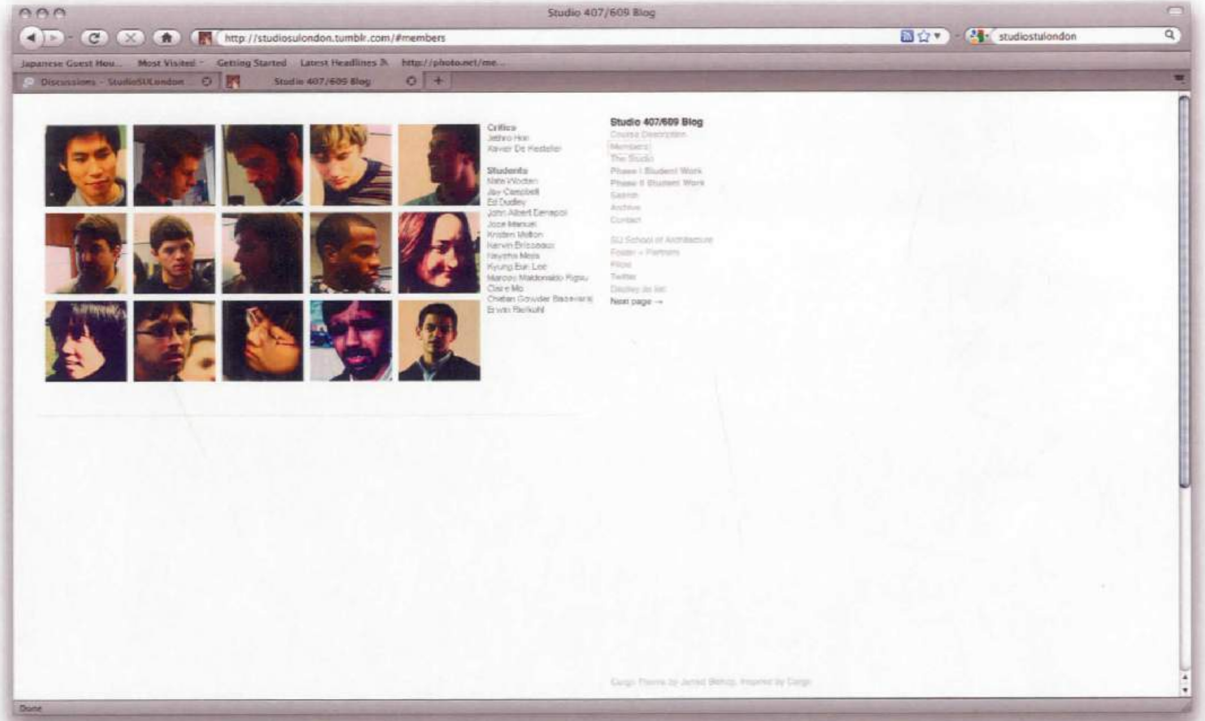




ABS-M30 Built on FDM
400 mc
Layer Thickness 0.127





WEB / BLOG

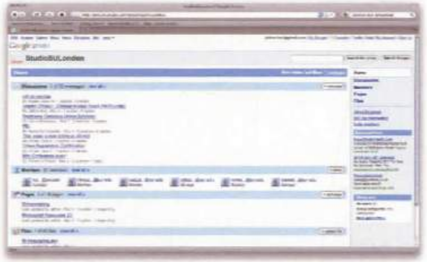
http://studiosulondon.tumblr.com/
http://www.flickr.com/photos/tags/StudioSULondon
http://groups.google.co.uk/group/studiosulondon











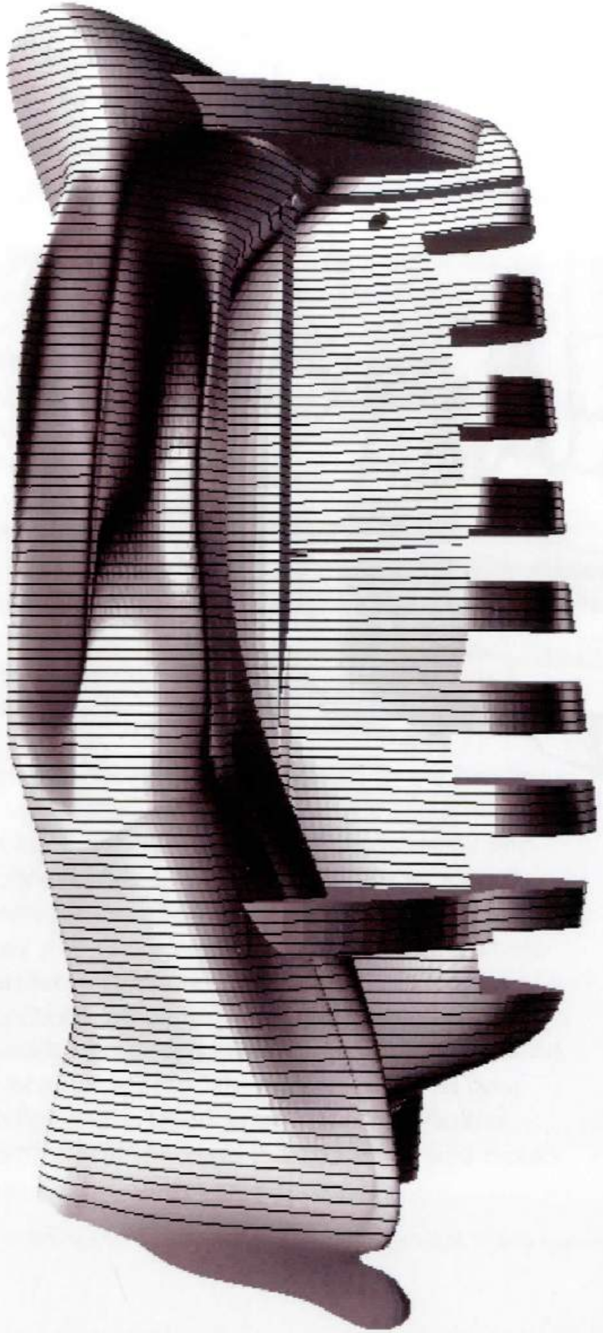

PHASE
I

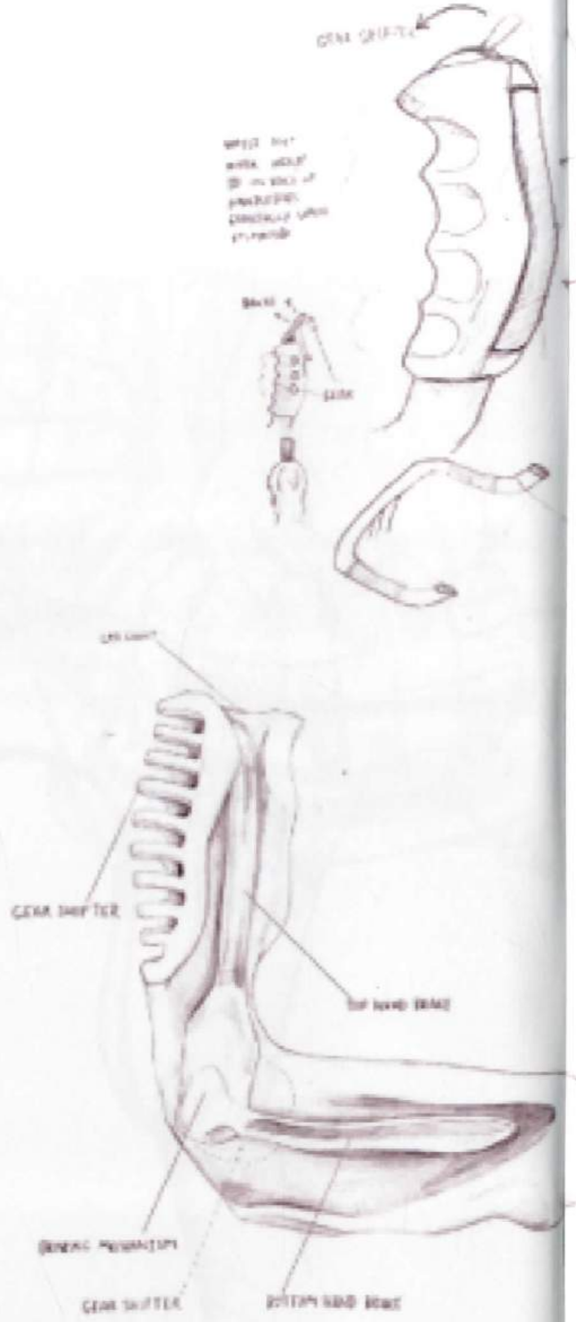
Customization of an Industrial Part

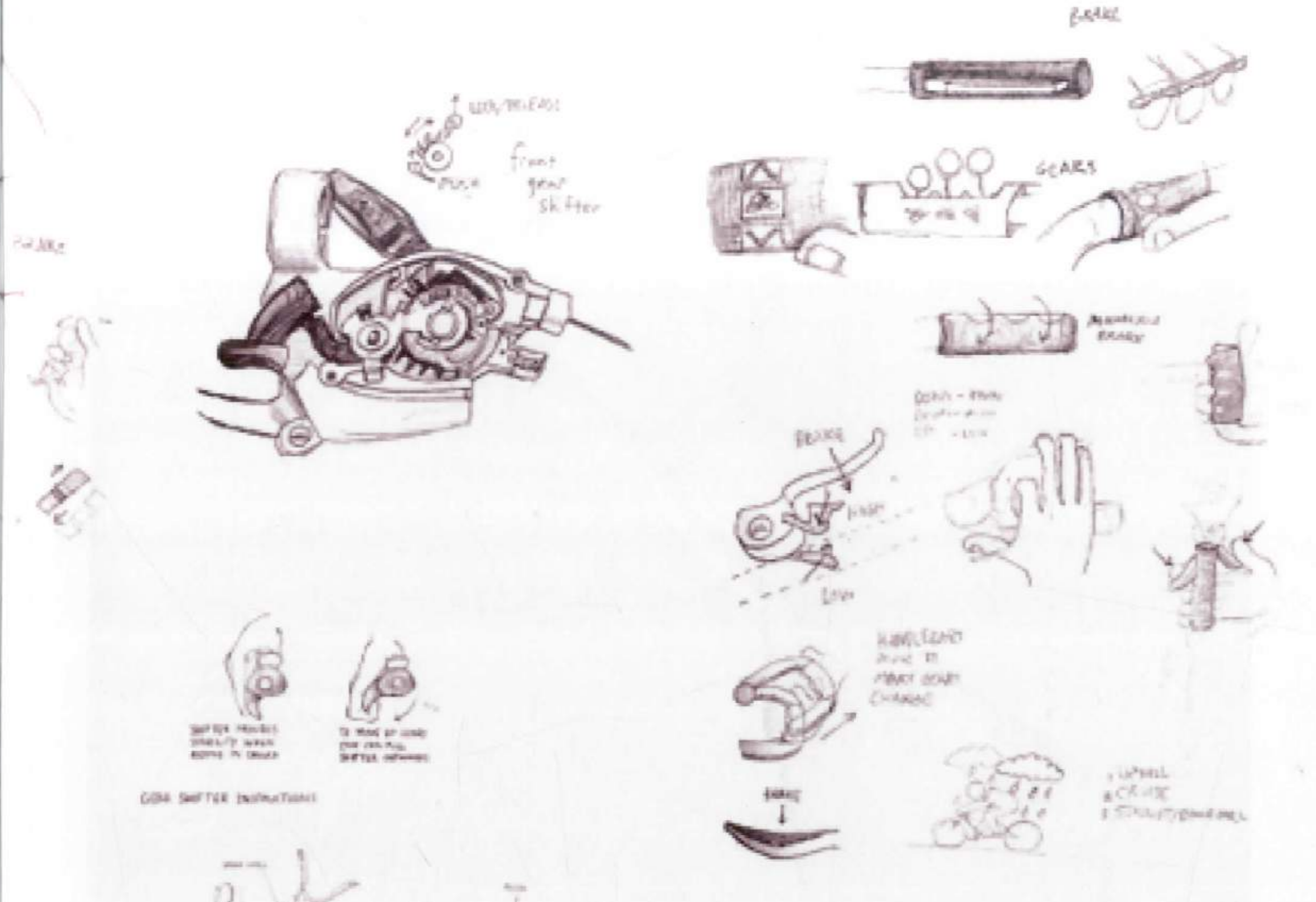
(visualization of fitted RP parts on London streets)

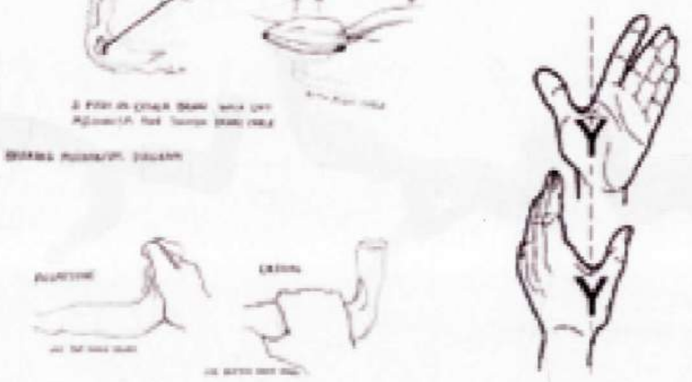
Customization of an Industrial Part

Phase I, which spans the first four weeks of the semester, introduces ideas of component design, usability and re-engineering of mass-customized industrial parts. A challenge set by careful evaluation of an industrial manufactured part and its limitations will allow participants to challenge its existing functionality and limitations for bringing a more integrative solution in question. A series of hands-on workshops, seminars, discussions and presentations will accompany this design development.



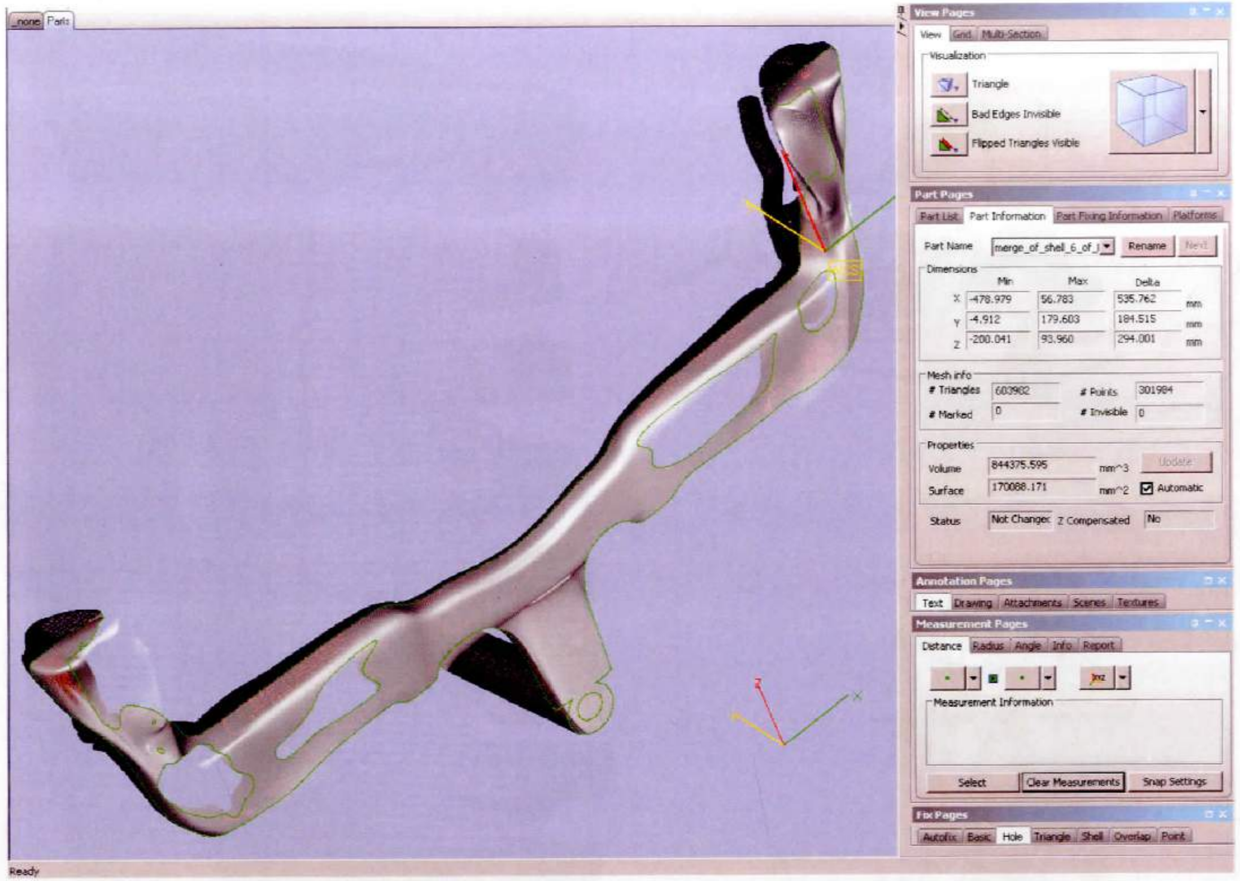


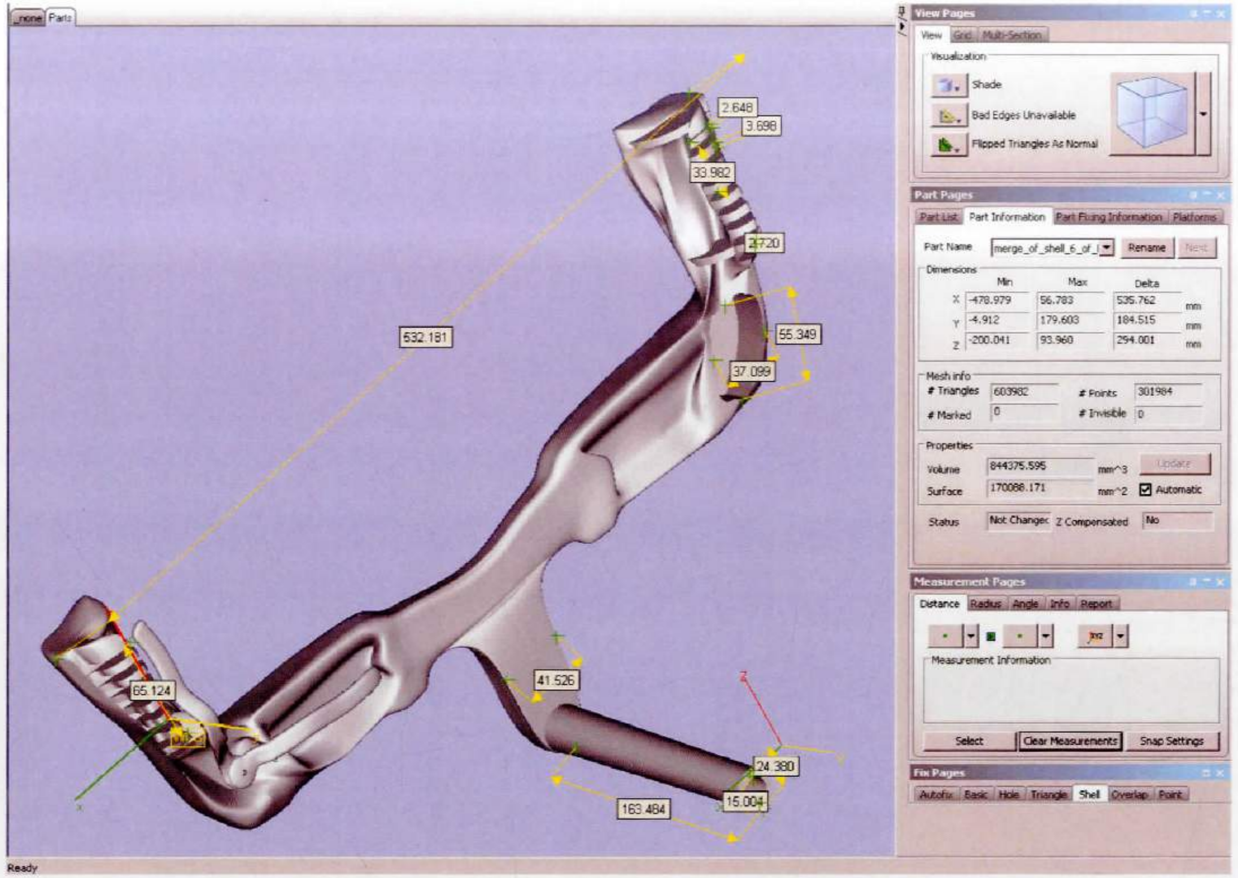


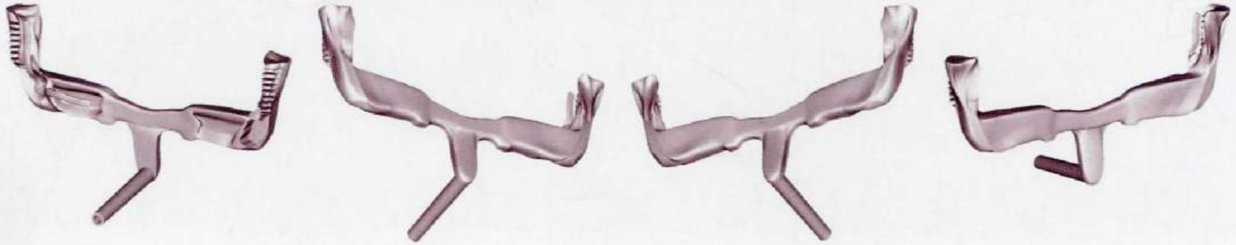


reDESIGN reCYCLE

JAY CAMPBELL | JOHN DENAPOLI | ED DUDLEY | KRISTEN KELTON

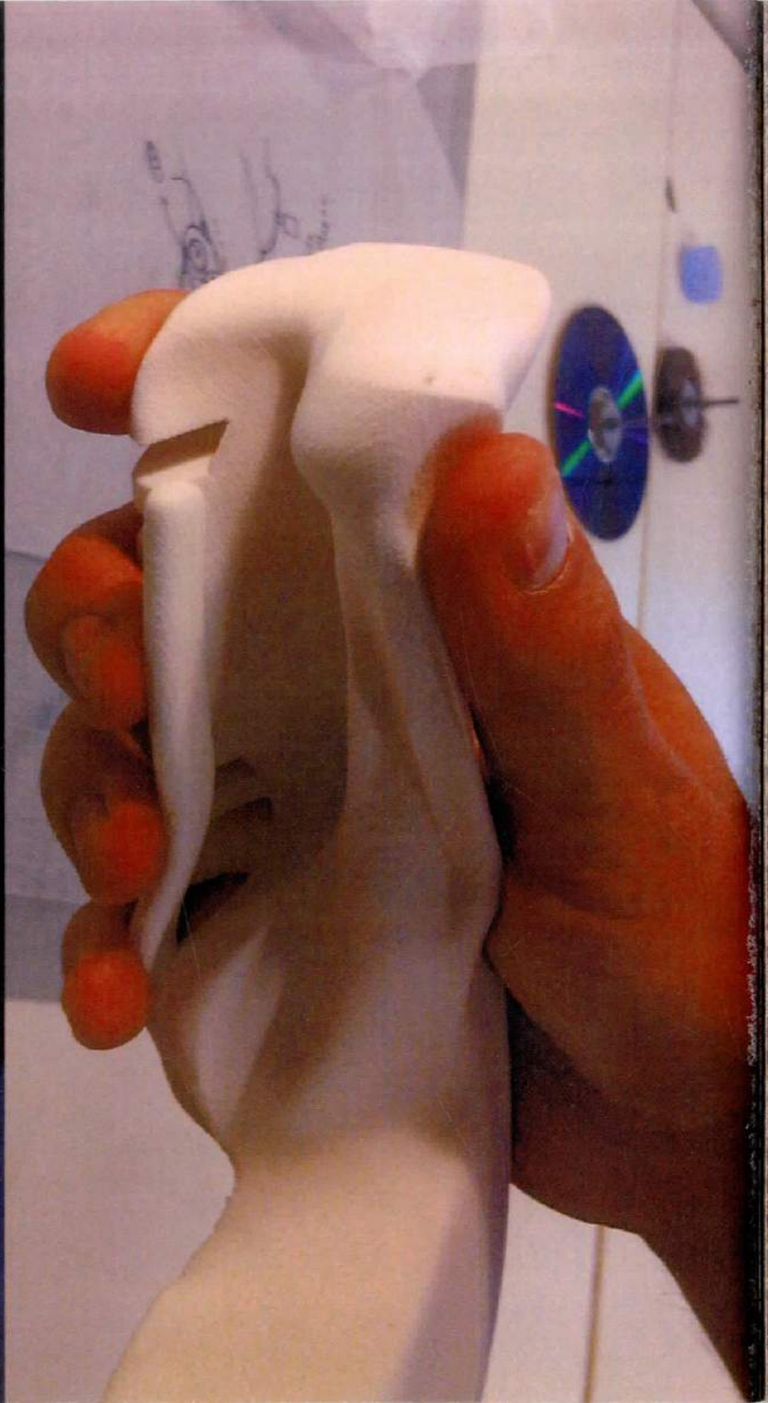






(top: part checking / fixing prior to delivering 3d data to Materialise, Belgium for 3d printing)

(bottom: various iso views of geometry)



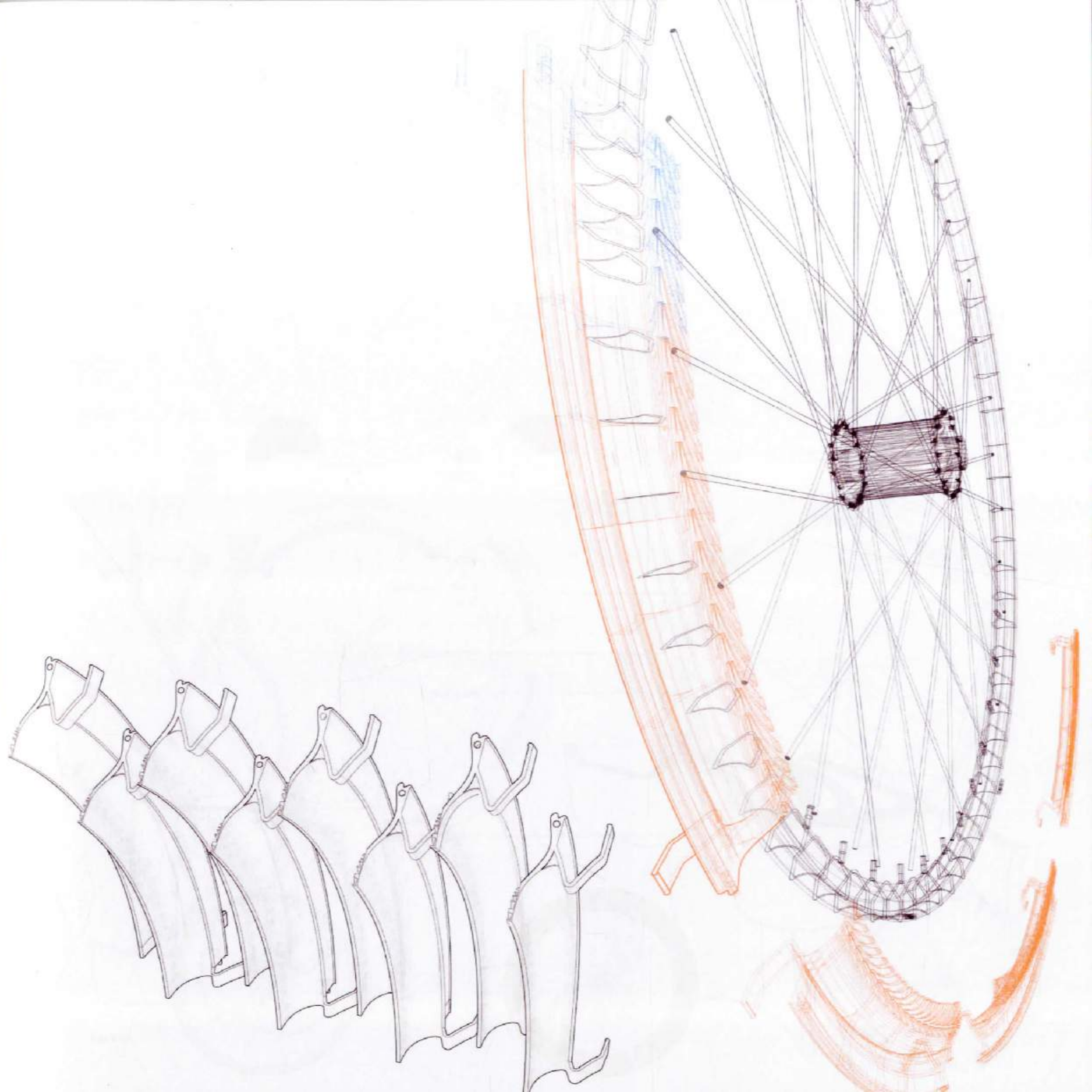

(left: SLS part of a bicycle handlebar;   right: concept sketch of the same handlebar)

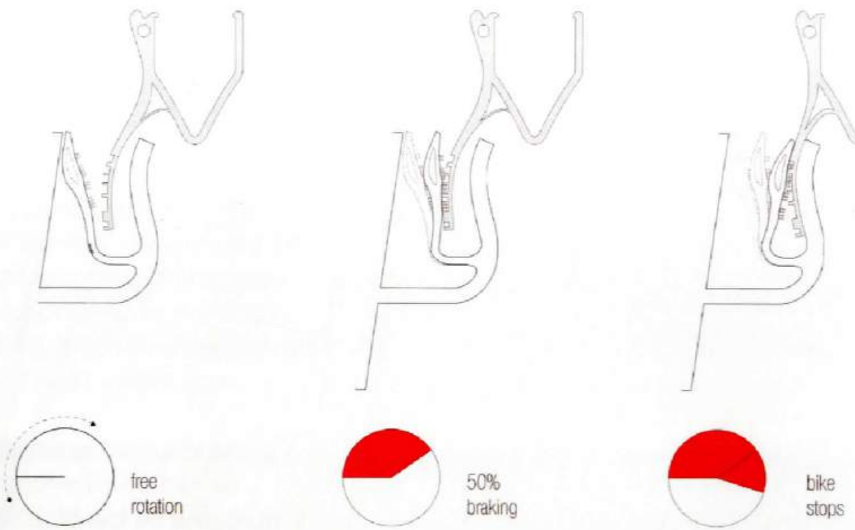
BRAKES

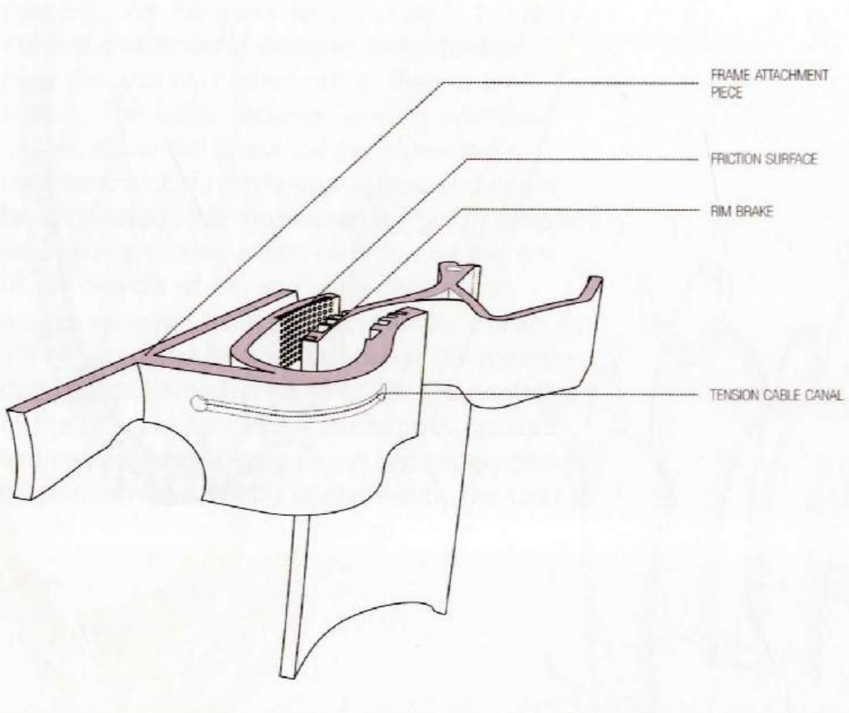
Chetan Gowder Basavaraj
Neysha Mejia
Marcos Maldonald Rigau

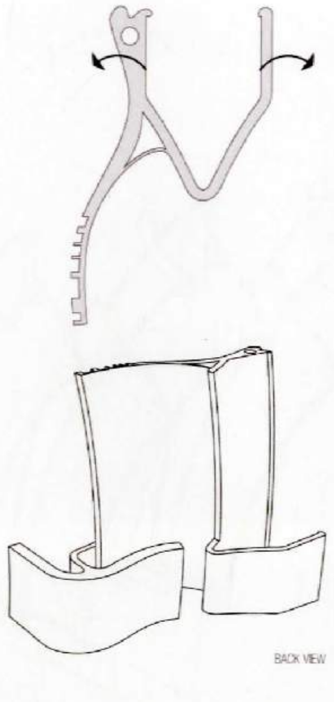
The variety of currently available bicycle braking mechanisms has led us to consider ways of simplifying braking systems. An exploration in additive rapid manufacturing processes further created an opportunity to develop highly bespoke braking mechanism which are economical for the London commuter.

By first examining a typical clamp braking mechanism, we questioned whether an engineered material could act as a friction medium through an additive manufacturing process. We then saw an opportunity to the current disc braking designs which brakes near the axis of rotation rather than at a radius. This often requires running additional cables to control brake caliper close to its rotational axis, which is impractical and could be eliminated. We envisioned a rigidly clamped-on braking system which re-enforces the rim of the bicycle wheel and uses patterns to across various braking requirements. Similar to shrink-wrapping design, additional clamped-on components are shaped to follow the contours of the rim and minimize disturbances created by irregular air movements. A secondary brake caliper can be carefully controlled by the user to adjust the friction while braking.

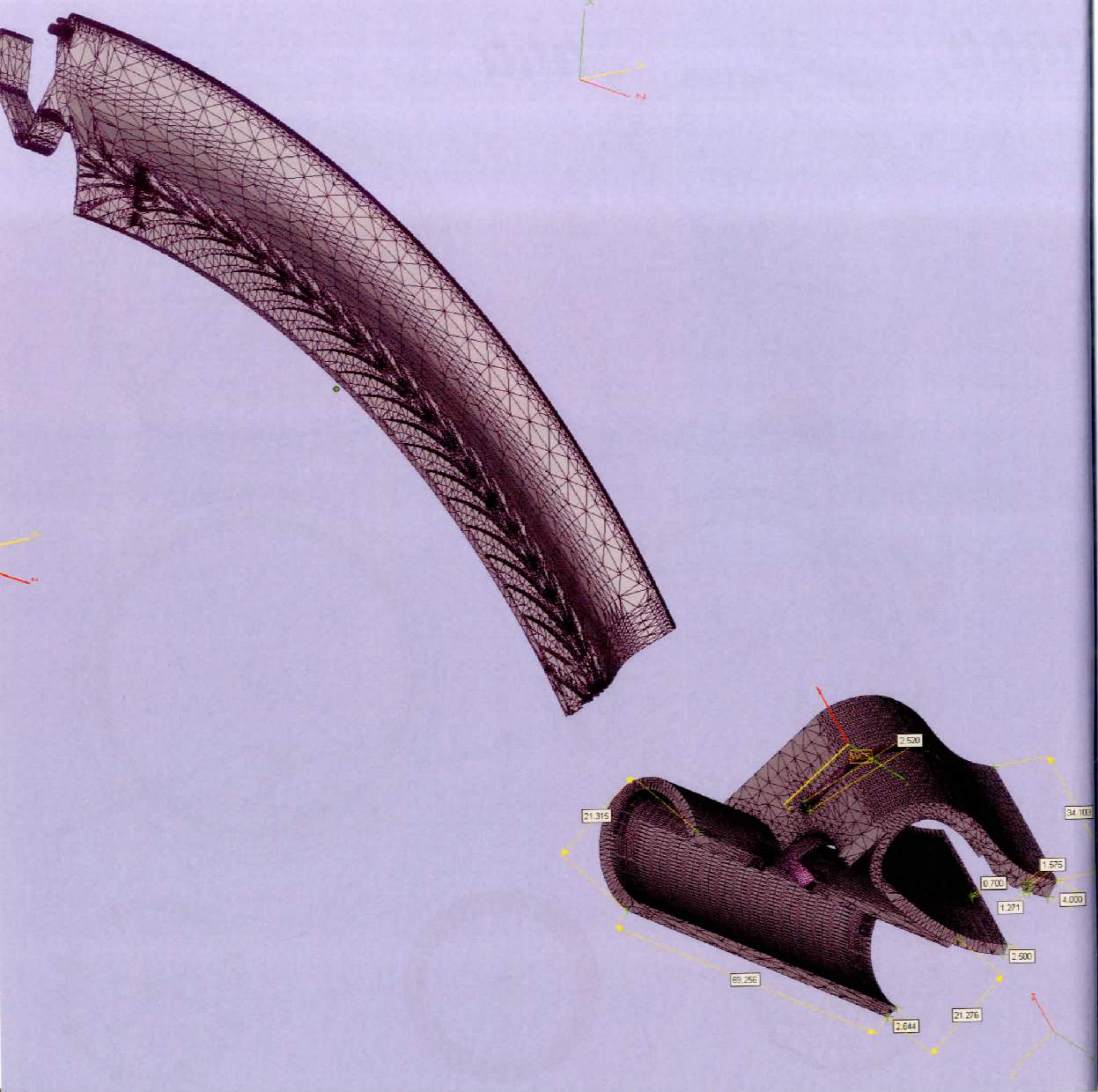


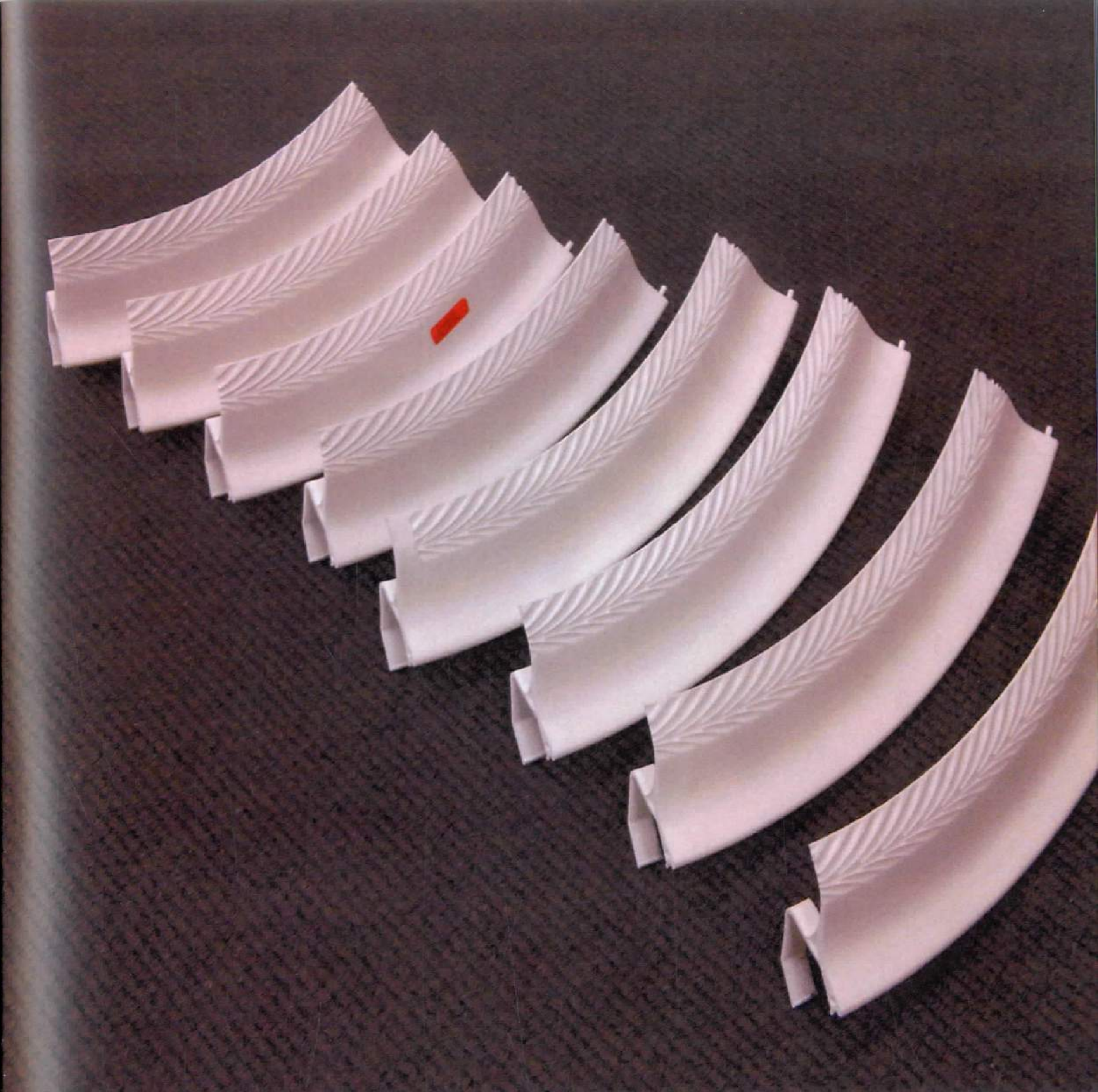

free
rotation
50%
braking
bike
stops

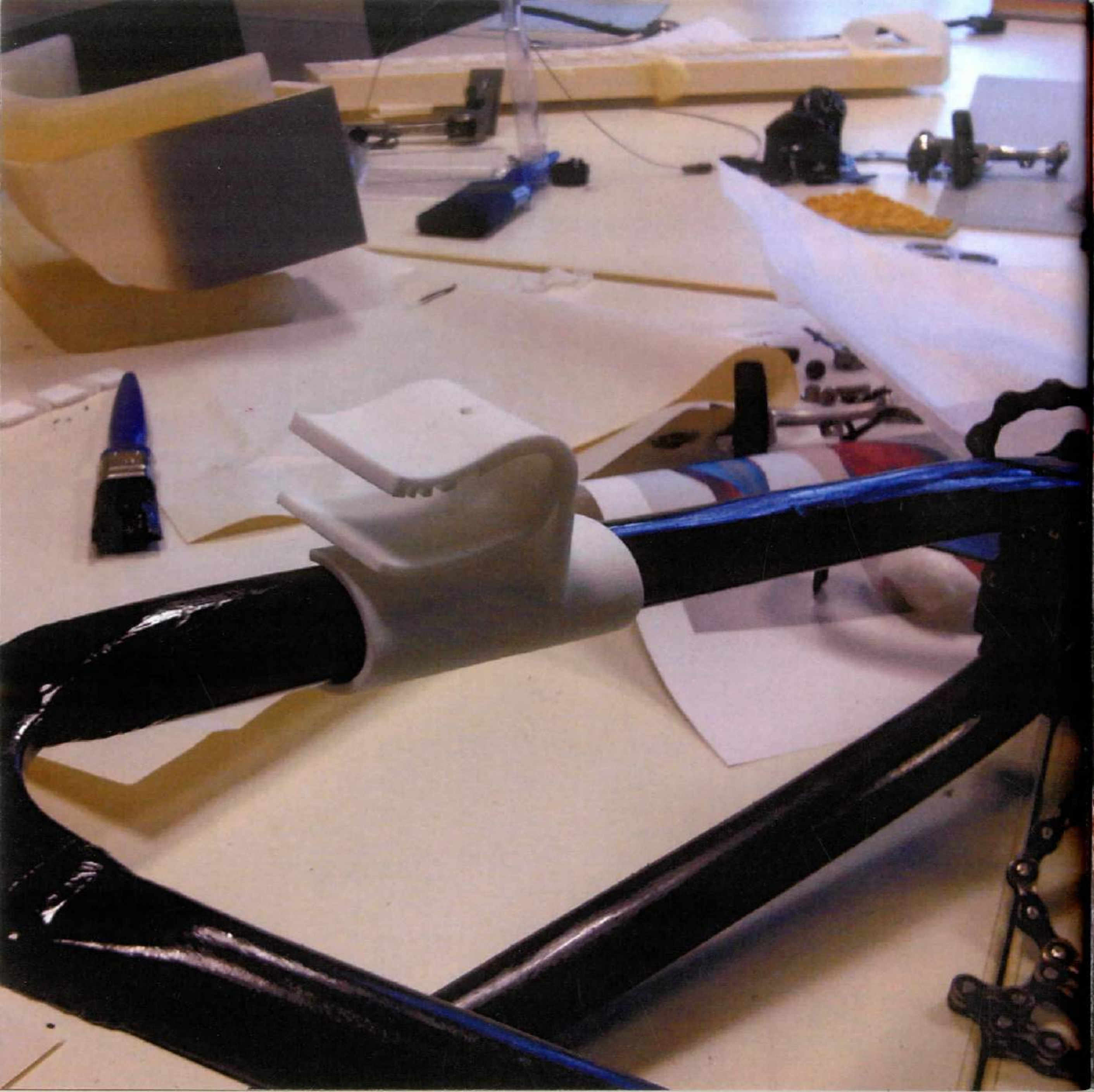

FRAME ATTACHMENT
PIECE
FRICTION SURFACE
RIM BRAKE
TENSION CABLE CANAL


BACK VIEW


0°


2.520
34.103
21.315
1.575
0.700
1.271
4.000
2.500
69.256
21.276
2.644

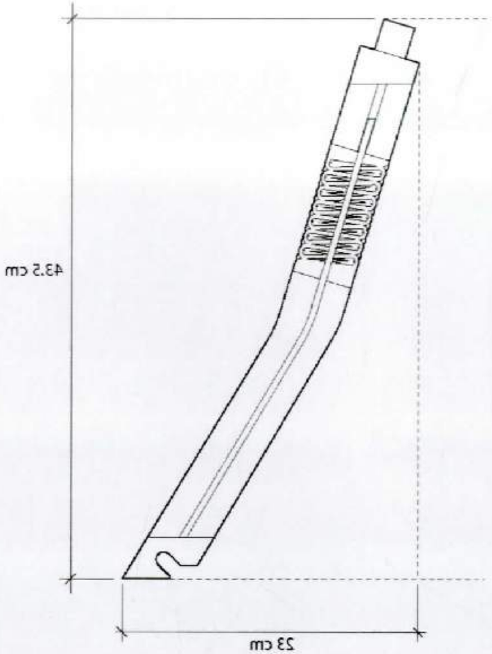


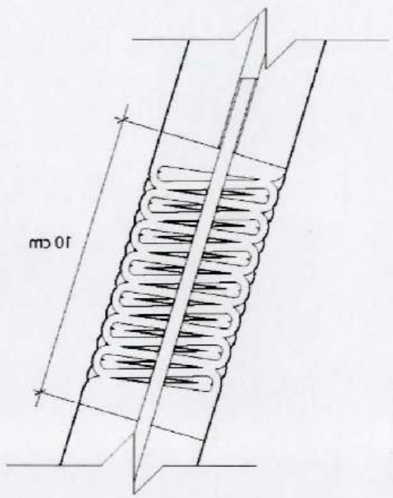
Fork Suspension

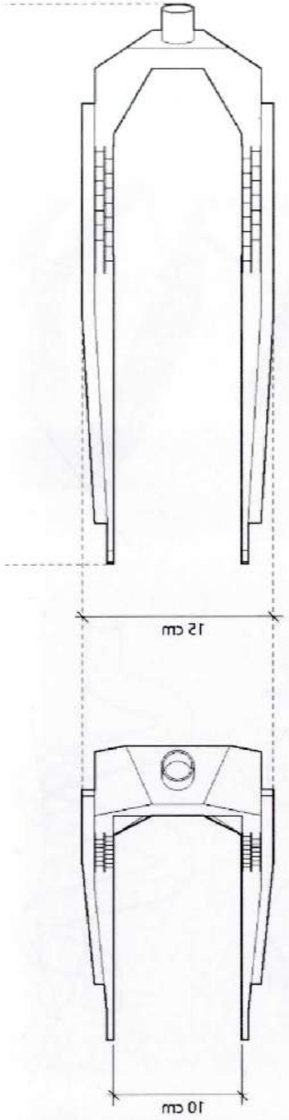
Kervin Brisseaux
Kyung Eun Lee

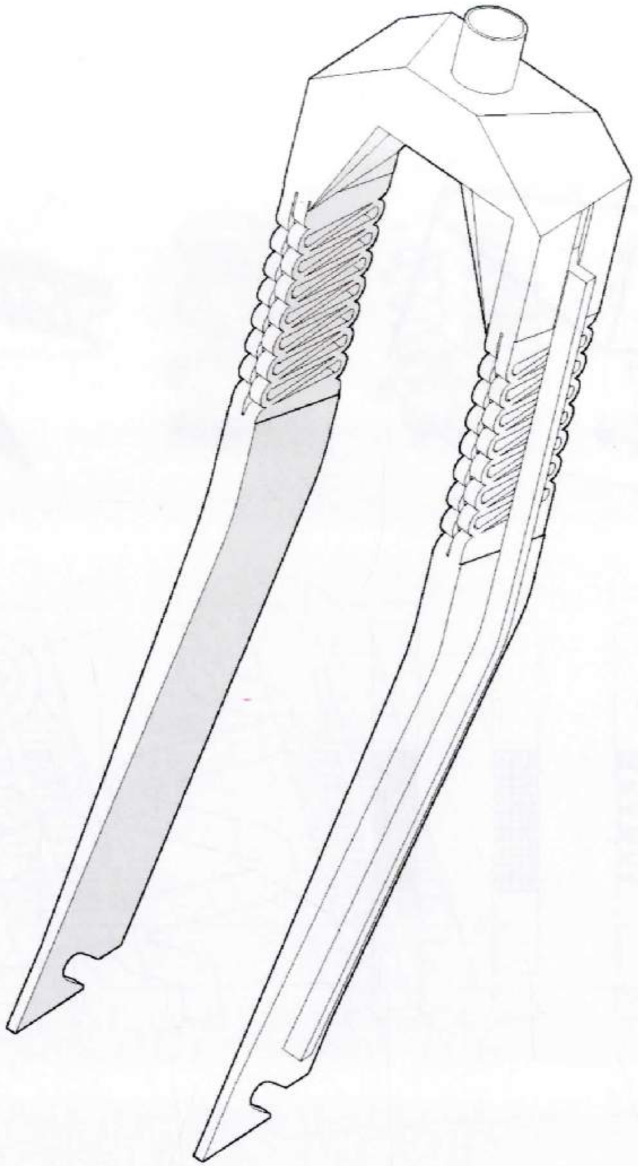
Typical bicycle forks are made to rigidly withstand high impact and provide sturdiness in handling the front wheel steering through various weather and terrains. This inevitably transfers each and every vibration immediately to the user which is in full contact with the handlebar. We question whether a careful engineering of the fork could provide a mean in dissipating vertical forces through absorption. Through the use of new digital fabrication, what additional functions could we bring into the traditional role of a bicycle fork?

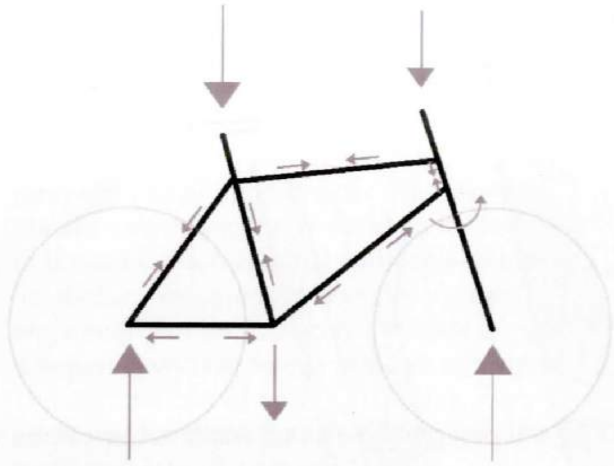
Fork designs, regardless of its material being steel, aluminum, carbon fiber, magnesium etc, tend to mainly exploit its rigid material property. We believe the geometry of the fork could provide other opportunities such as localized suspension or micro suspension at the material level. By developing a double-linked coil shock absorption as a fork suspension design, we aimed to achieve an integrated design for the light mountain biker. This would eliminate the need for an add-on suspension system. Through careful decoupling of lateral forces from vertical movements (direction of travel + vibration) allowed a possibility to negate unwanted shock and or movements. The overall weight reduction further reduces the magnification from road noises.

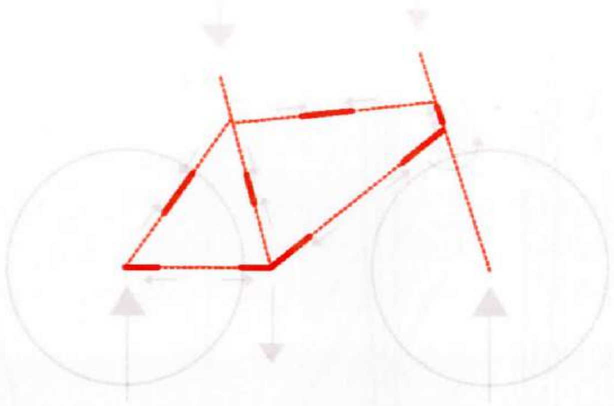


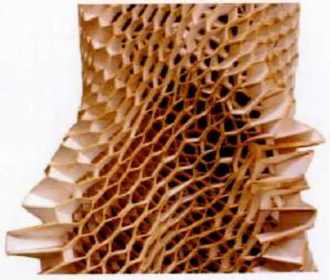


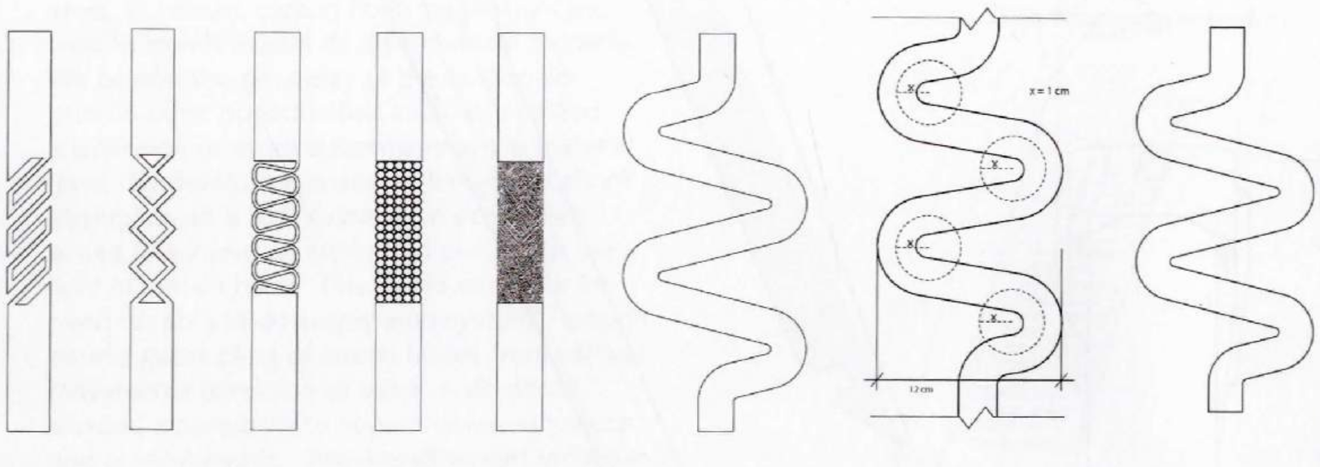


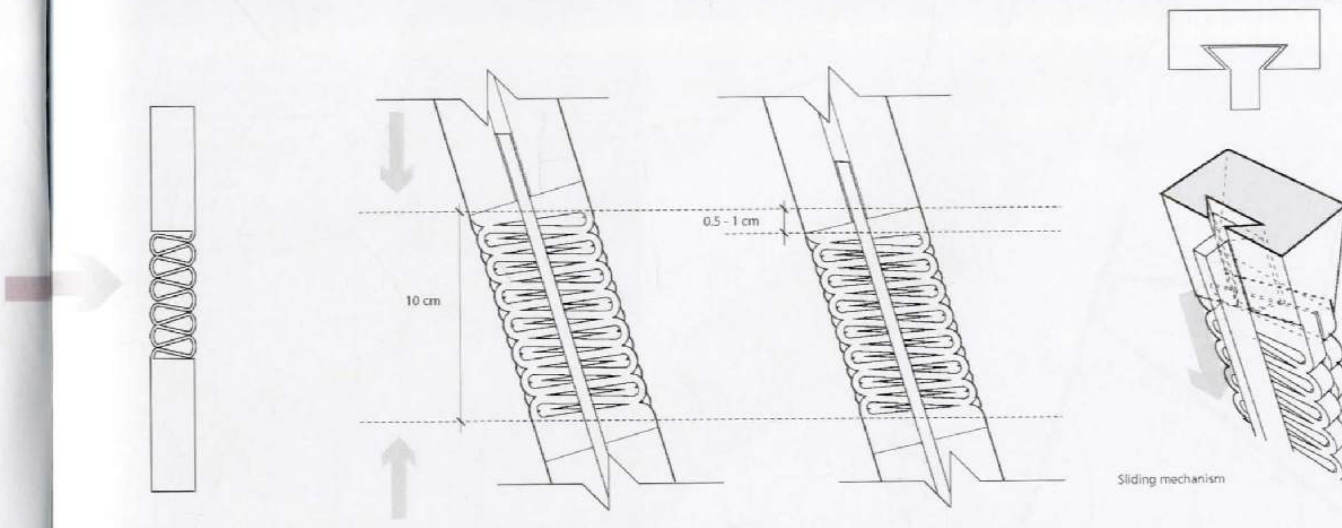


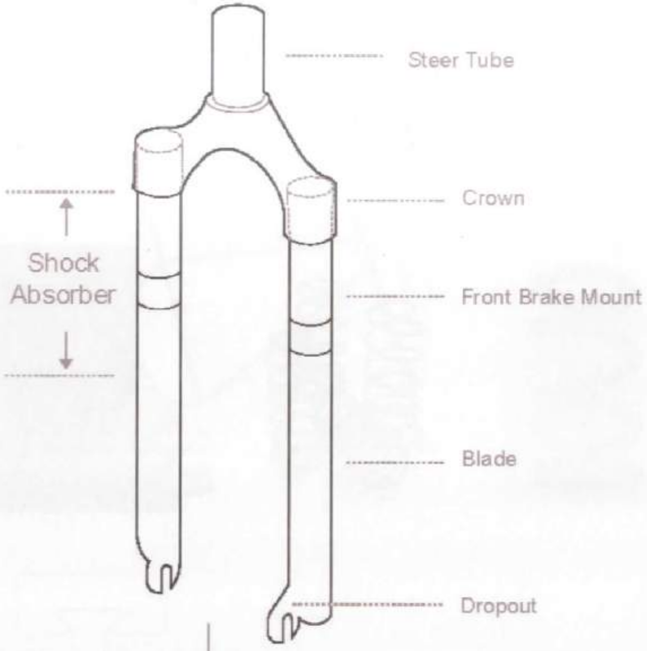


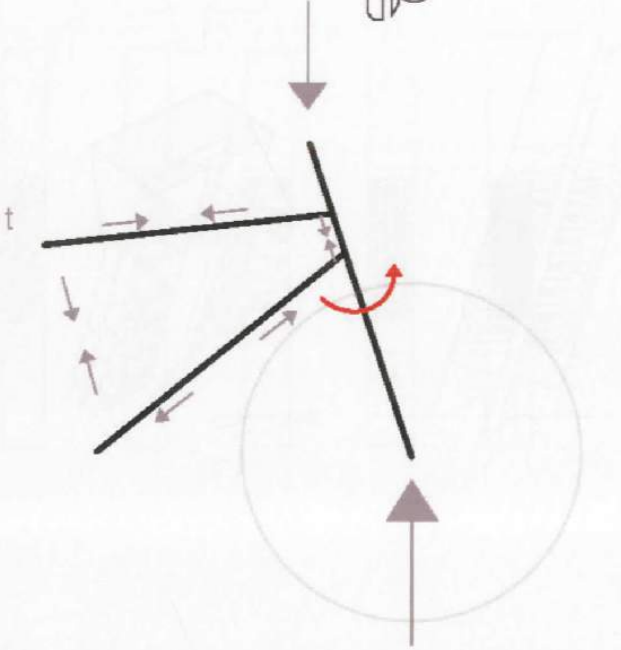




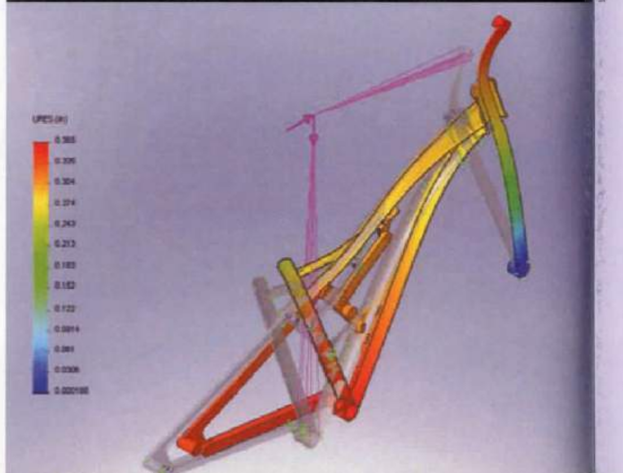

x = 1 cm
12 cm

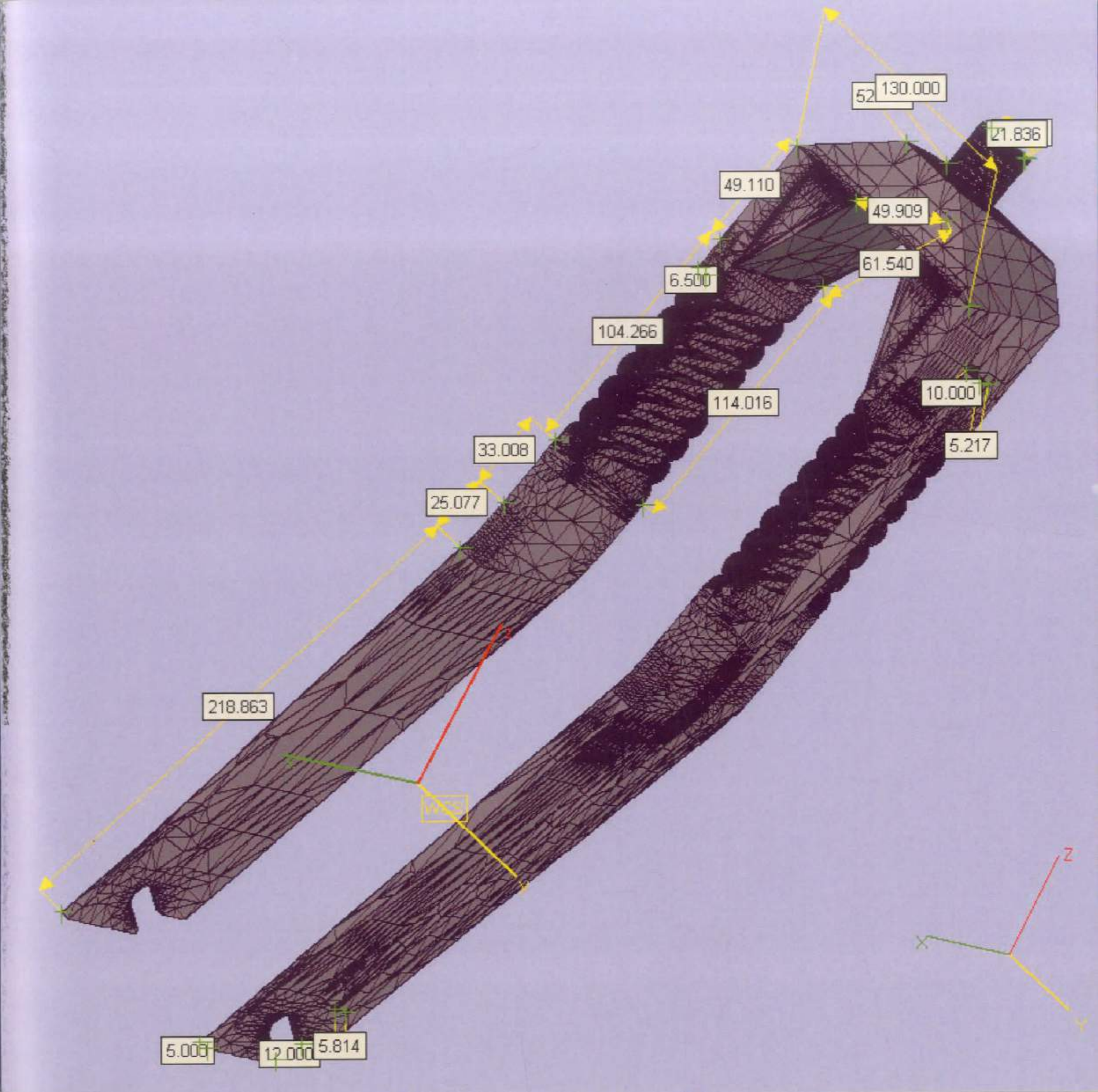

10 cm
0.5 - 1 cm
Sliding mechanism

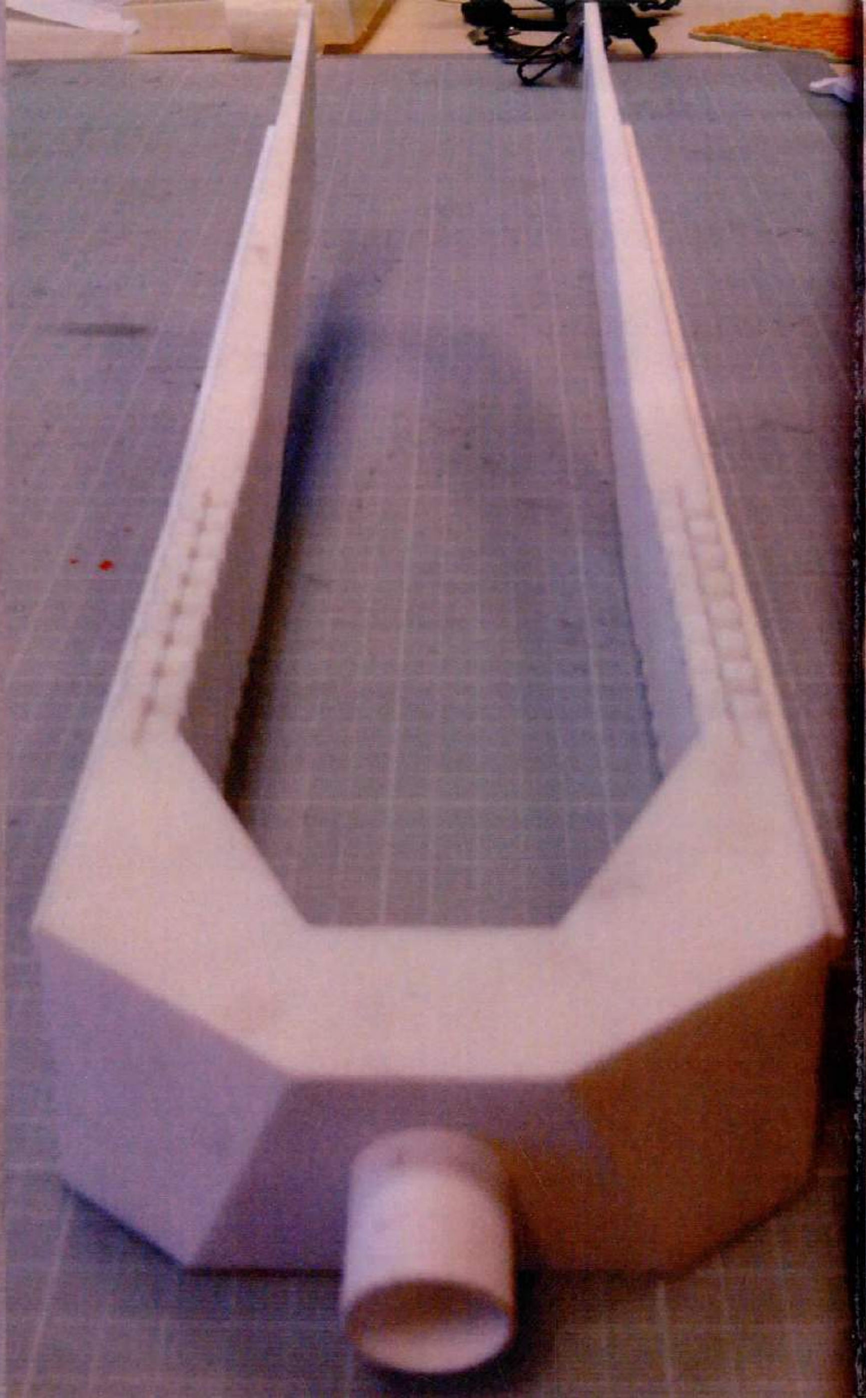




Anticipated Stress Loads







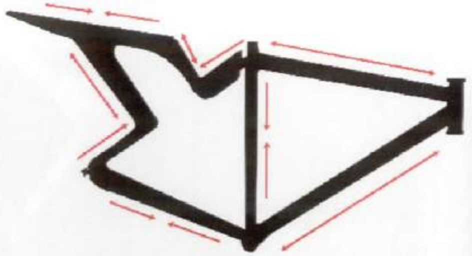
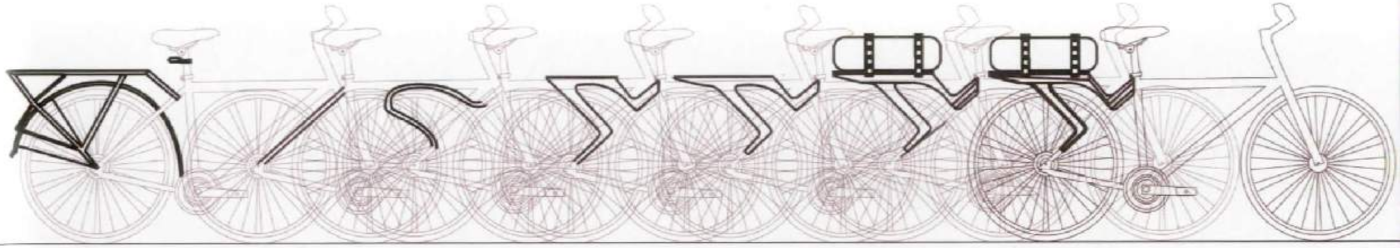
Fender

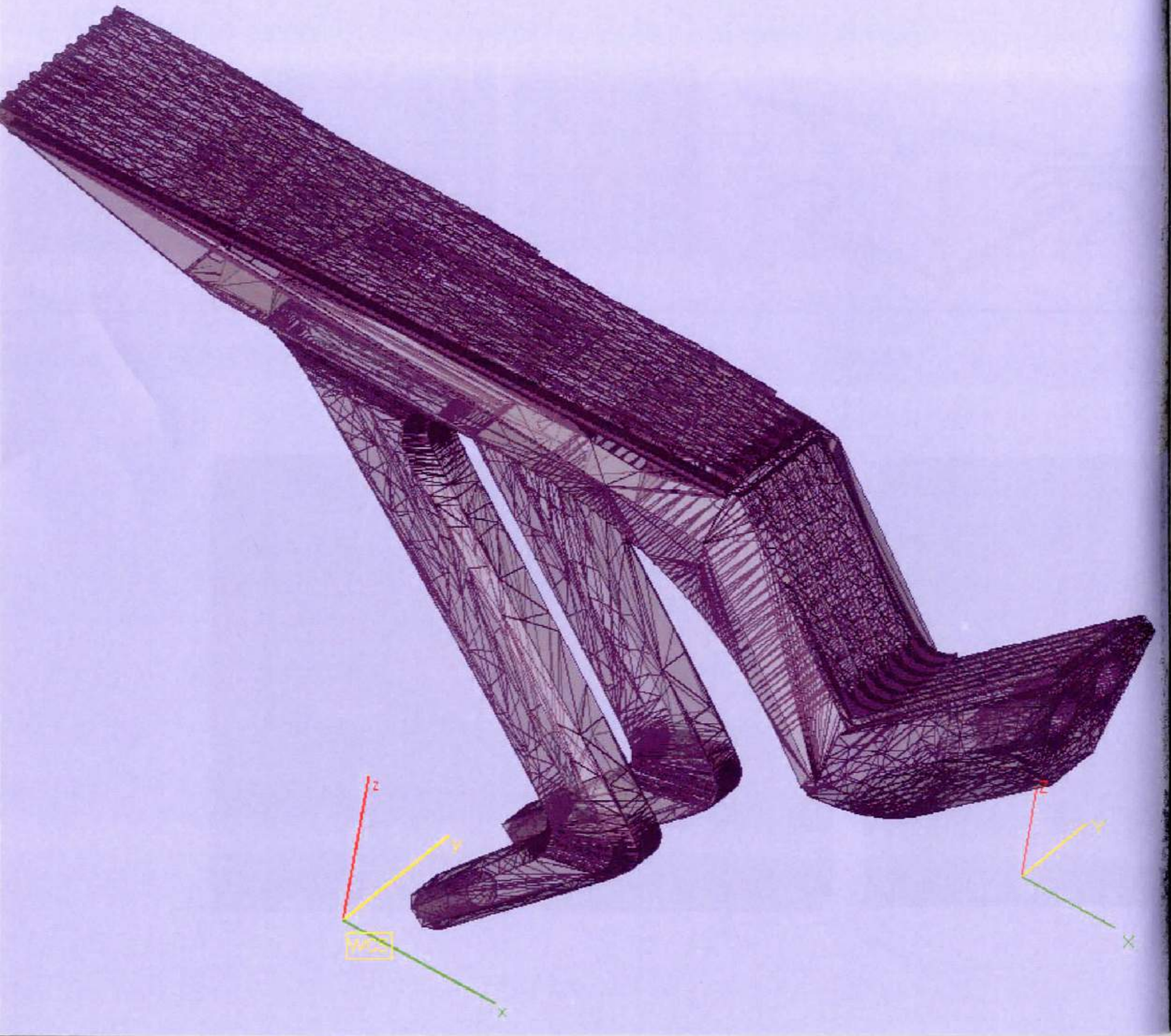
Jose Manuel
Erwin Riefkohl

Our design is not an add on. A re-designing of the bicycle rack and fender has been thought of as part of the structural frame design.

Storage racks and fenders currently on the market are offered as fitted accessories on bicycles. Often the integrity of these accessories is minimal if at all. How would we then incorporate accessories into the structural frame as one integrated design component of the bicycle? If we replaced a structural member with another structural member that allows more function to the bike frame itself, it would eliminate the need for an add on item.





z
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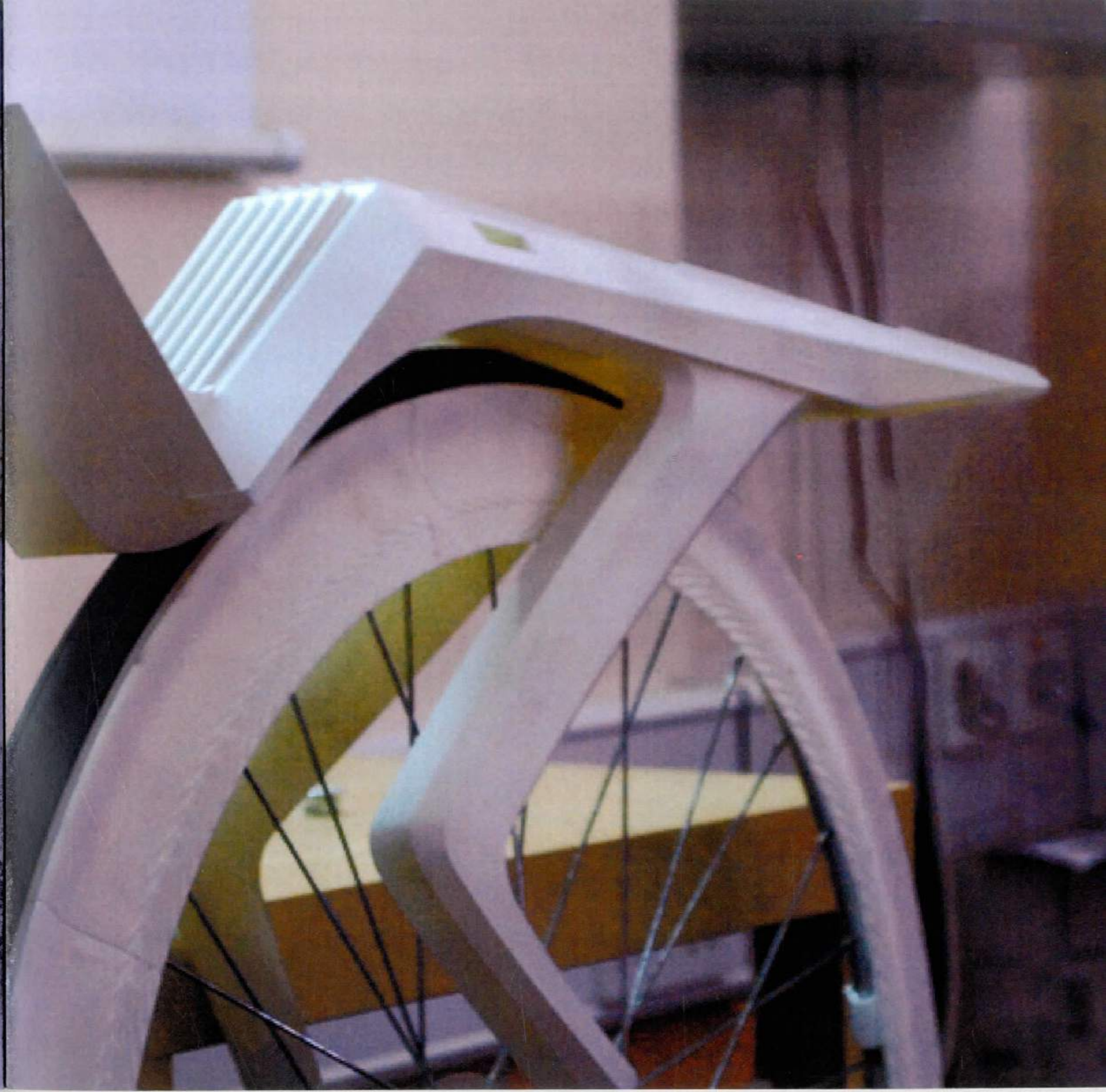
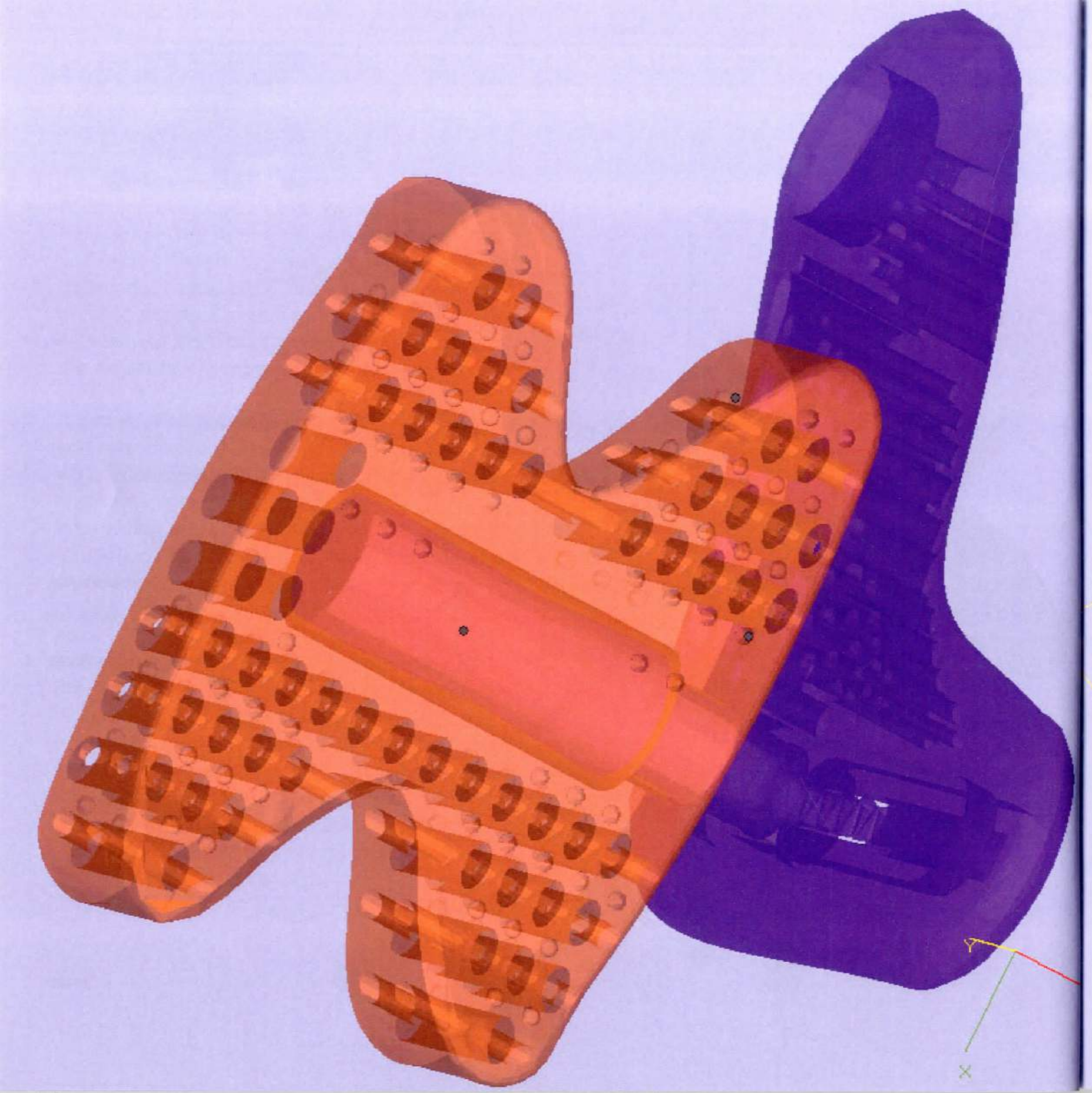


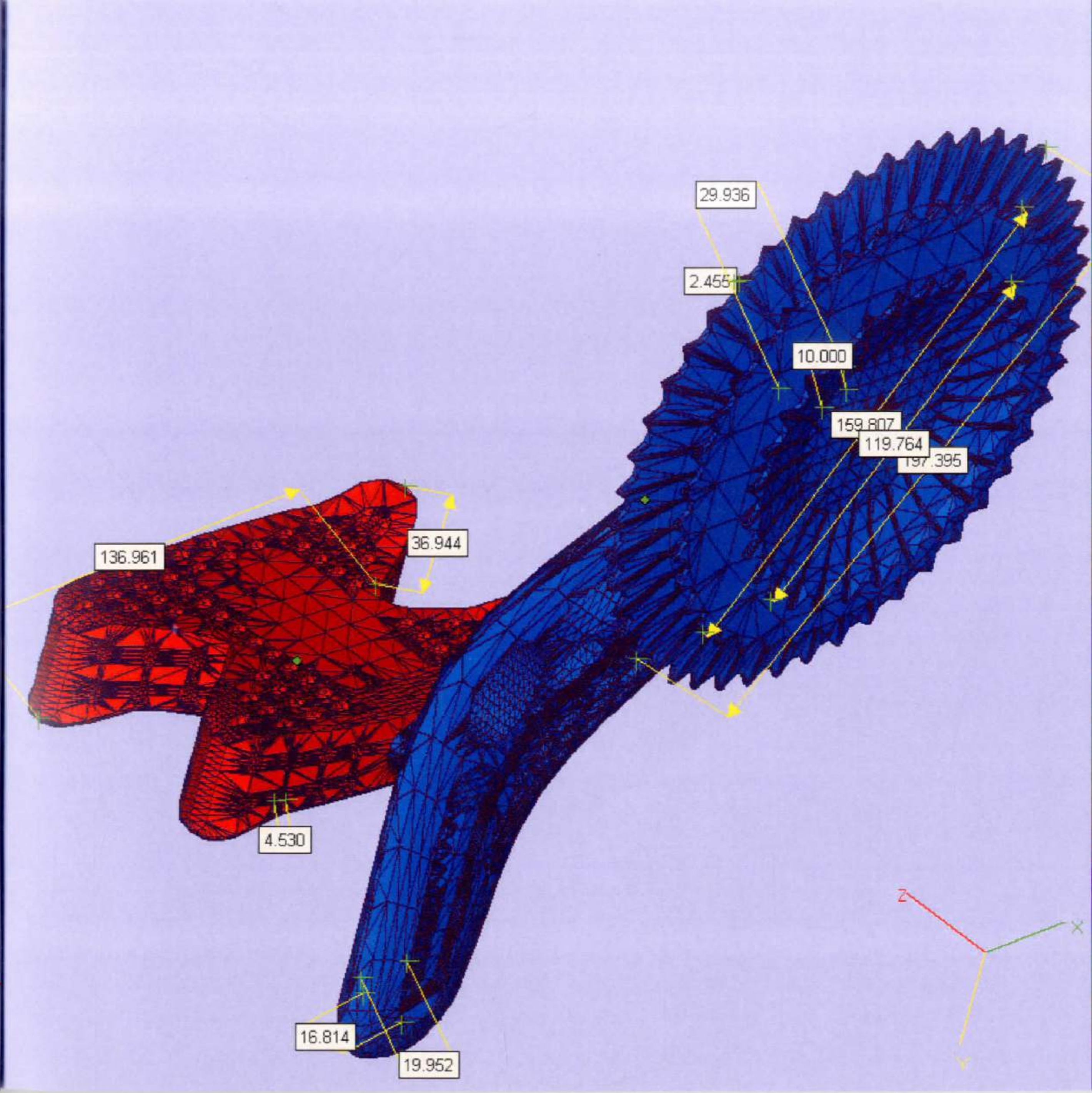
Pedals

Claire Mo
Nate Wooten

At each clock position throughout 24:00 hours, the user pedals through a variety of positions and forces transfers or lost opportunities. If we examine a typical pedal and crank configuration, its fixed degrees of freedom in movement limits its ability to store energy which could return to the cyclist to minimize effort.

A series of studies in pedaling foot positions and rotation were documented for informing ways in designing an integrated pedal, crankarm, crankset connection and mechanism. By introducing a coil internally within the crankset, it functions as an energy storage from specific clock positions and act as a sprung-spring cyclical procedure when the cyclists pedals back towards the upward positions. This aims to create a more aided and naturally defined elliptical profile which the pedal orbits around the crankset. In addition, by engineering an integrated crankarm and set as one component, we were given greater control as to how the function of chainring to the pedal can be geometrically defined to achieve minimal material requirements while maintaining maximum performance.

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