

Don’t dread the poster!

Some ideas to stop hating them

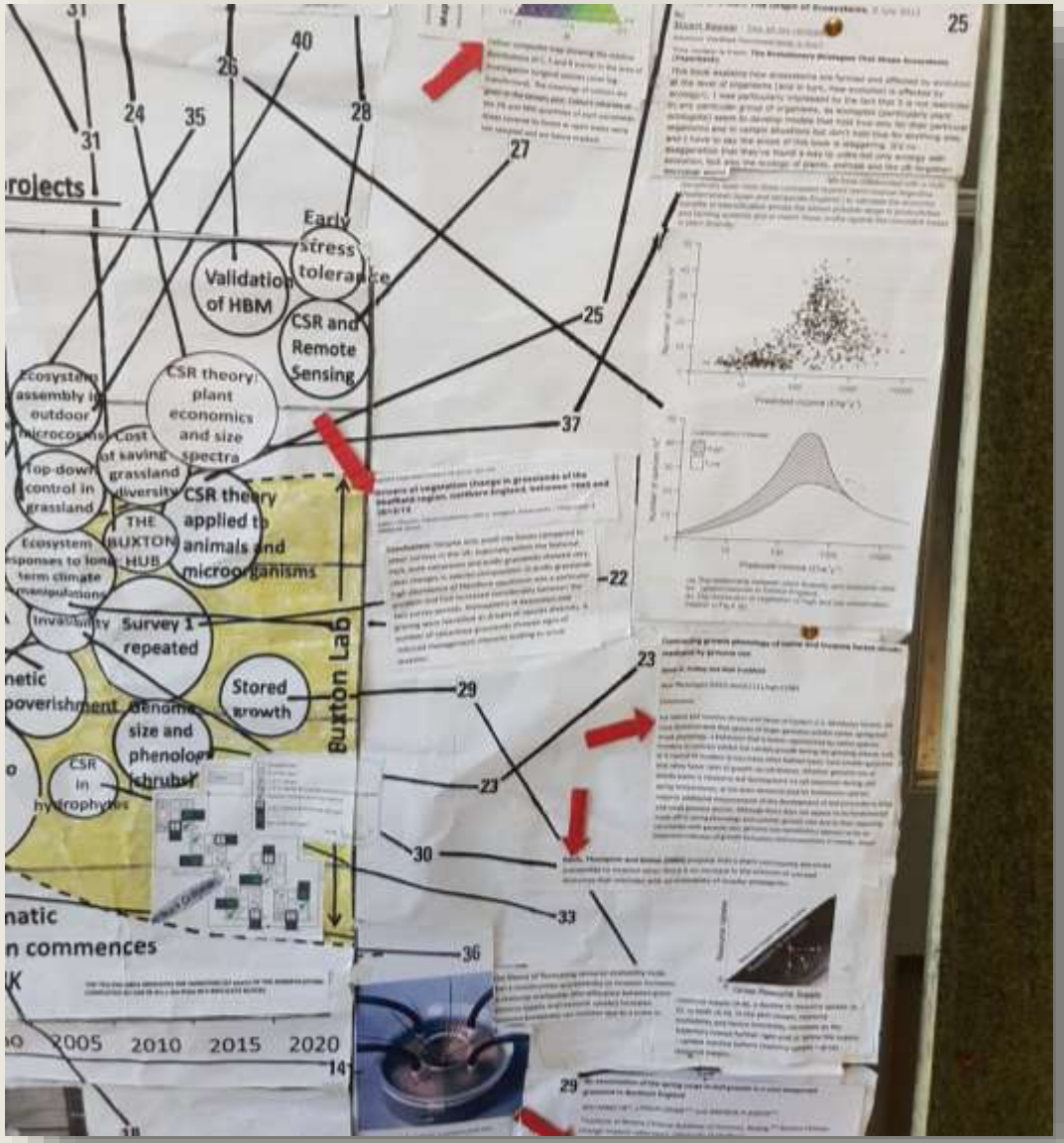
How do I feel when I see a poster



http://phdcomics.com/

Well, there are people who **literally** do copy-paste

This a section of a **real** poster presented in a **real** conference



I asked some people their feelings about posters

A very distant second place at conferences.

Missed opportunity

Difficult

Ugly

Time-consuming

I hate them

Overcrowded with info

What a colourful and nice thing that nobody remembers after all..

Boring

Quite depressing, indeed

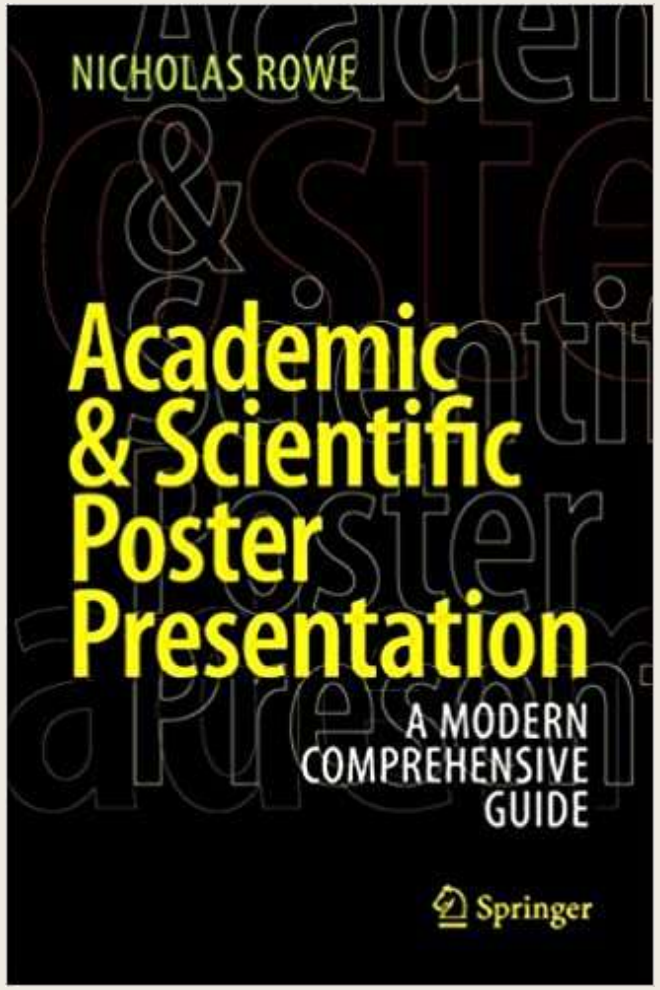
Only three books about posters…

Compared to dozens (or hundreds?) about presentations

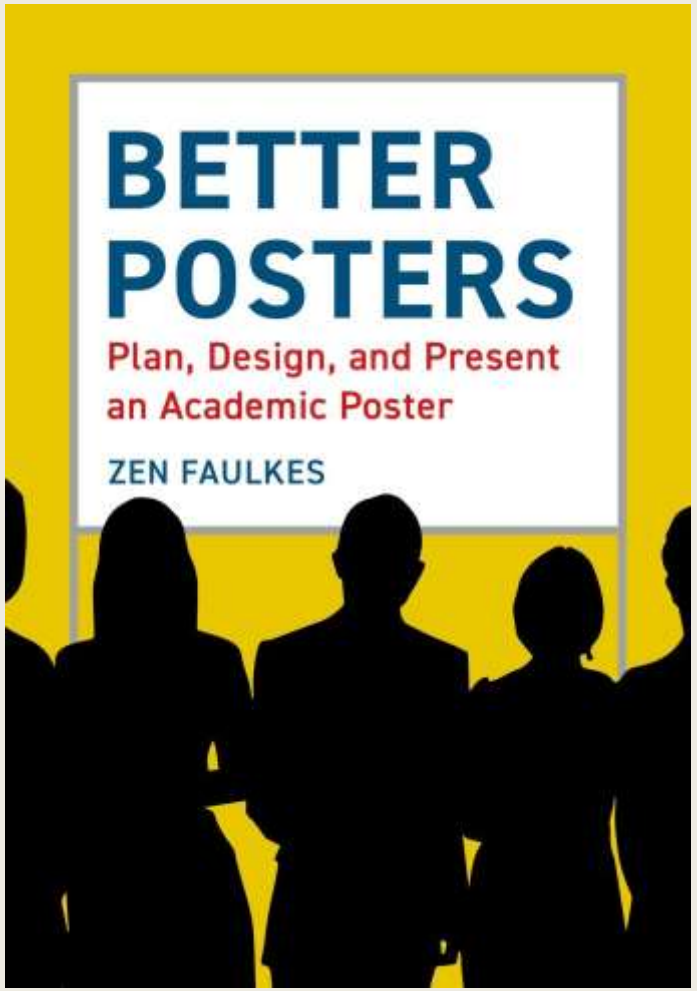
1999



2017



2021

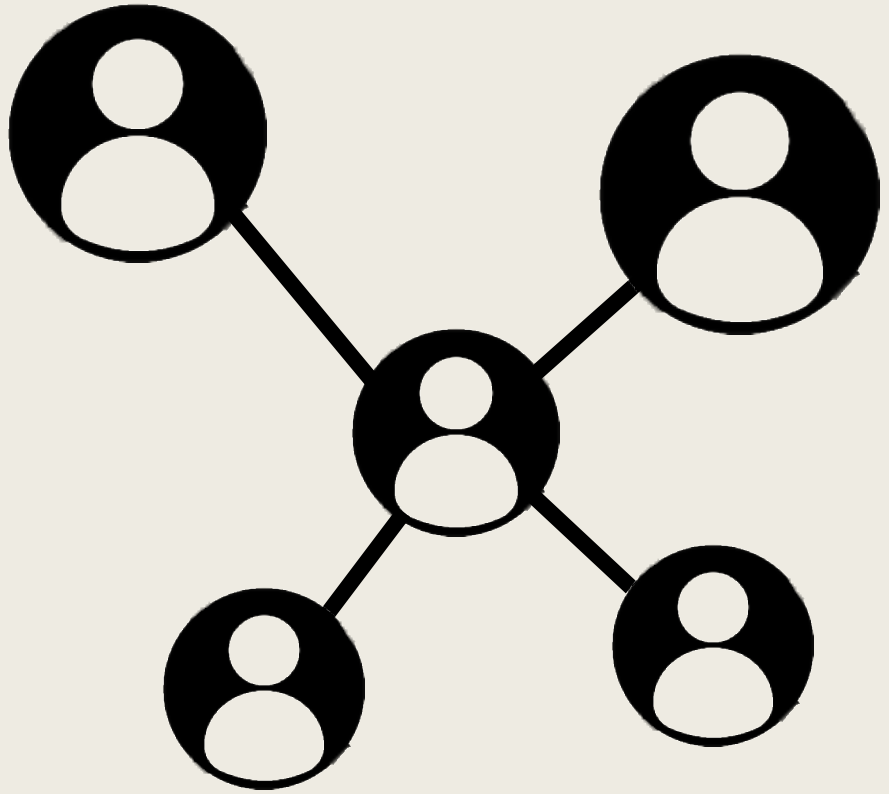


They are definitely…

Second-rate

What’s then the PURPOSE of a poster?

The purpose of posters is… networking!



"We make posters to foster discussions and promote selective, efficient and meaningful interactions"

Jean-luc Doumont, Effective research posters

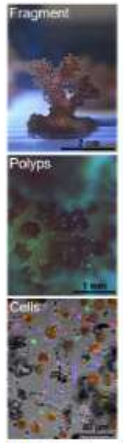
How NOT to design a poster


Making a poster like
packing your suitcase…
not a good idea

Example of a packed ~~suitcase~~ poster

Coral Microbioreactors For Model Validation

VCU Chemical and Life Science Engineering
College of Engineering



1. Introduction

Advances in coral biology and ecology are hindered by the complexity of the system (symbiotic relationship with dinoflagellate algae, dense and diverse microbiome) and scales at which different mechanisms operate. While colony-level studies are widespread, there are fewer single polyp scale and cellular level studies (Fig.1). Coral research has mainly been conducted top-down by testing colony response to describe cellular processes. Developing coral-specific microbioreactors can help us change to a bottom-up approach that can have the double function of feeding computational models and validating the ensuing predictions. They can, for example, enable us to investigate protein interactions and gene expression applied to the response of corals to environmental change, toxicity (e.g. microplastics), disease and injury at the cellular level, the polyp level and the colony level.

A number of "coral-on-a-chip" designs have been developed to study micro-scale interactions between corals and their environment but they mainly allow investigations at the polyp scale[1-4] or colony scale (nubbin: colony subset)[5,6]. The device by van Treuren et al.[7] presents the highest resolution by trapping individual larvae in a funnel-like channel allowing single-larvae imaging during the experiment (symbiont expulsion during thermal stress-induced bleaching in symbiotic anemone Aiptasia). Despite the technological advances these devices represent, control of environmental properties and number of replicates remain limited, and the cellular scale has still not been achieved.

The design presented here offers multiple independent input/output channels to control growth media or treatment parameters (flow, temperature, composition), light (for photosynthesis) and live-imaging capabilities (traditional or inverted microscopy) Fig.2-3. It also permits multiple configurations (single chamber or network, Fig.3-4) to study biological interactions at different scale with simple logistics.

Fig.1: Coral scale

Fig.2: Parameters to control

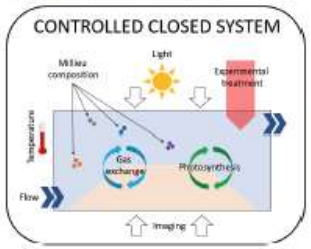


Fig.3: Chamber design

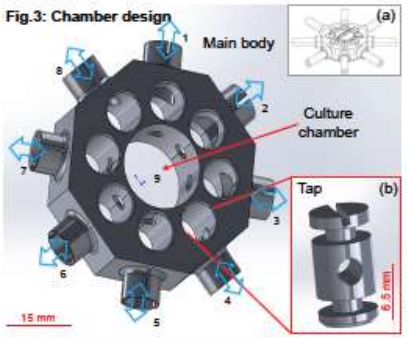
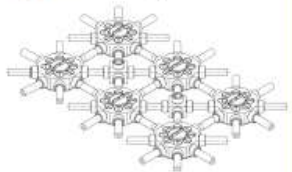


Fig.4: Network configuration



2. Materials & Methods

Chamber design – Reef-building corals require specific environmental conditions (*e.g.* light, temperature, salinity, pH, nutrient, ammonia). This device was designed to enable control over irradiance (transparent material VeroClear®), temperature (external heat source or heated media), flow (9 input/outputs, Fig.3), media composition, photosynthesis, gas exchange and experimental treatment while allowing observation using microscopy (top and/or bottom) Fig.2-3. This octagonal microfluidic device also offers the potential for single or multiple well configuration (Fig.4, well volume: 3.62 cm^3), which allows investigations at multiple scale (cell<polyp<colony, Fig.1), and can be fitted with microsensors. It is easy to make (3D polyjet printer: Objet Eden 260VS, VCU Innovation Lab), setup and transport with potential for field applications.

Microfluidic parameters – Shear stress and velocity fields were modeled using computational fluid dynamics simulations of COMSOL Multiphysics® software. The simulations were aimed at optimizing the device design by varying valve diameter, well diameter and valve length. A flow rate of 2 mL/hour was applied and flow was divided equally across inlets when multiple inlets were used. Furthermore, to model the simulations, a laminar, incompressible flow field was assumed due to the low Reynolds number (RE<<2000) and a no-slip boundary condition was applied to the interior of the device to account for viscous effects.

Simulations also focused on the potential chemical transport through the system in relation to chemical dosing and exposure. For this, 180 mg/L of glucose were modeled with the flow rate of 2 mL/hour. Fick's law of diffusion[8] and the mass continuity equation govern the diffusion of the species through time[9].

Live testing:
Planned for January 2021

3. Preliminary Results

Computer simulations were essential to model flow and inlet/outlet configurations considering the many options available. Over all the configurations tested, maximum shear stress and velocity remained low (0.62-2.6x10^{-4} m/s and 0.38-3.1x10^{-4} Pa, respectively) Table 1. The time to steady state solution was 5 hours. Variations in well diameter, valve diameter and valve length (Fig.5) revealed larger diameters (well and valve) and longer valves resulted in lower maximum velocity (0.62 m/s) and lower shear stress (0.38x10^{-4} Pa) Table 1.

Photosynthetically Active Radiation (PAR) measurements (dry, Apogee®) show the device lid reduces light penetration to the well by ~30% compared to the external light (Fig.6).

Of the two external heat sources tested for media temperature control only the hot plate setup was successful at reaching and maintaining the target temperature of 25°C (20min).

Further computer-assisted simulations of flow and chemical transport highlighted the need for intermediate connectors in the network configuration to ensure multiple wells can be dosed simultaneously (four at a time, Fig.7). The configuration including connectors showed no significant increases in flow velocity or shear stress inside the culture wells. The highest shear stress (~1x10^{-4} Pa) and flow velocity (0.7x10^{-4} m/s) were observed in the center of the connectors.

Table 1: Maximum velocity and shear stress (flow rate: 2mL/hour)

	Valve diameter (cm)	Well diameter (cm)	Valve length (cm)	Maximum velocity (m/s)	Maximum shear stress (Pa)
Test 1	0.5	1.6	1.2	**0.62 x10^{-4}**	**0.38 x10^{-4}**
Test 2	0.25	1.6	1.2	2.3 x10^{-4}	2.8 x10^{-4}
Test 3	0.25	1.2	1.2	2.4 x10^{-4}	2.9 x10^{-4}
Test 4	0.25	1.2	0.8	2.6 x10^{-4}	3.1 x10^{-4}



Fig. 5: Device internal geometry and shear stress modelling

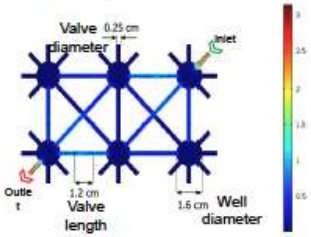


Fig. 6: PAR measurement comparison (dry)

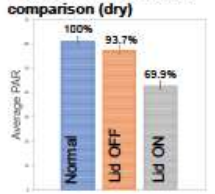
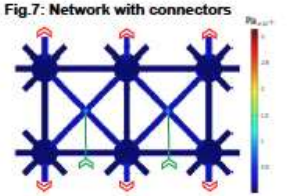


Fig.7: Network with connectors



4. Discussion

Although preliminary results are limited and more testing remain the octagon design is promising. We were able to design and tailor a microfluidic device permitting single well and network configuration to study transport and exchanges between multiple "sibling" organisms (or cells). The device's practical aspect means fitting microsensors for continuous measurements will be possible.

Live testing will enable us to check for potential further adjustments, and key parameters/measurements to be uploaded to machine learning platforms currently being developed specifically for the study of reef-building corals.

5. Conclusion

This device presents multiple advantages compared to previously developed "coral-on-a-chip" devices: single well and network configuration, simultaneous dosing of the wells, control over nine inlet/outlets, microsensor retrofitting, top and bottom imaging, minimal flow velocity and shear stress, 3D printable and compact.

The octagon will be an essential part of the feedback loop between experiment biology and bioinformatics focused on reef-building corals. This will facilitate the study of coral protein-protein interactions, calcification, disease & toxicity response, and wound healing from the cellular, polyp and colony level.

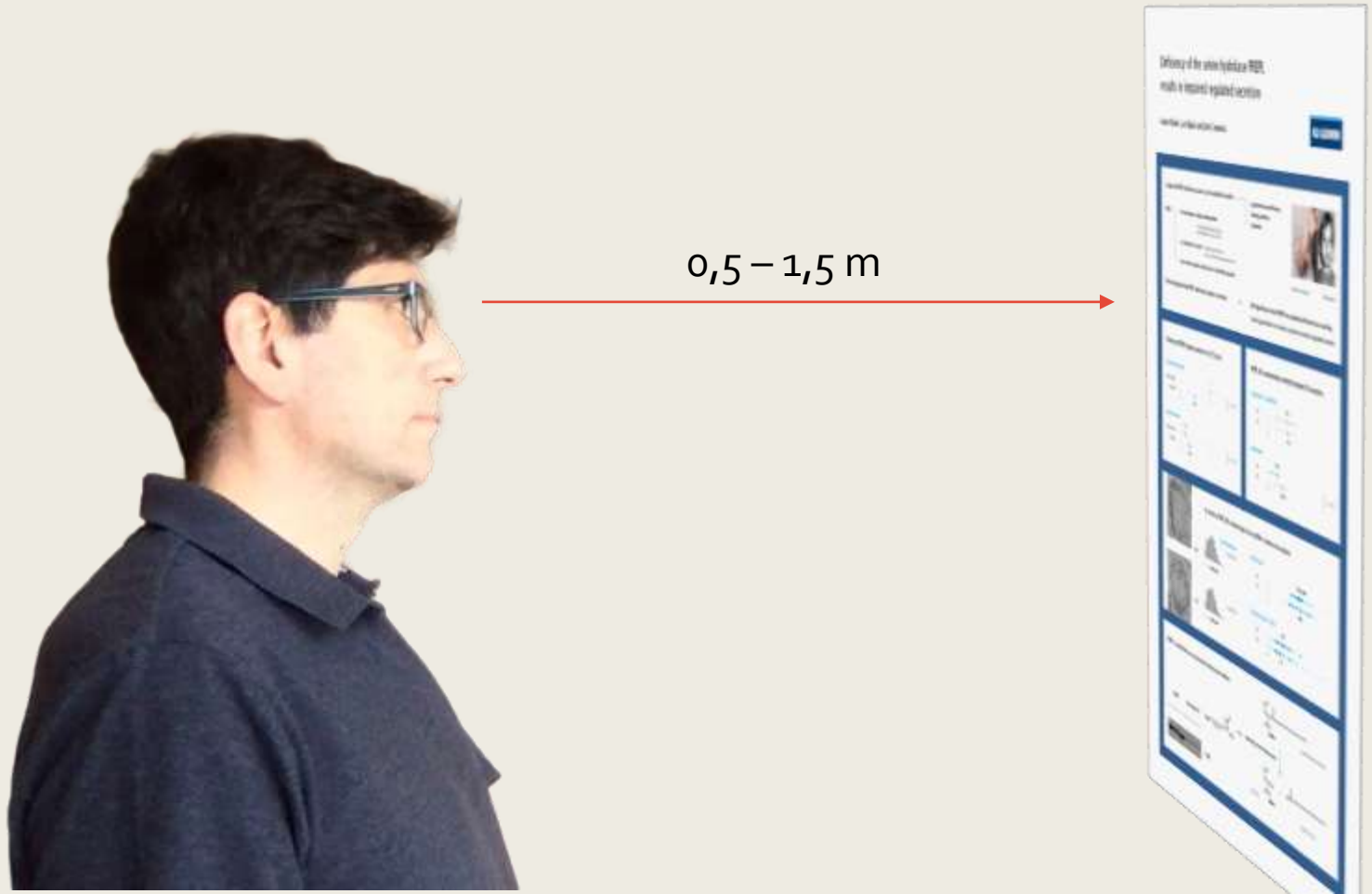
Acknowledgements
The authors would like to thank all contributors to the Synthetic Coral HDR project, Philippe Roger and Adam Hamel. This material is based upon work supported by the National Science Foundation under NSF Award Number 1939699.

References
[1]Shapiro et al., 2015; [2]Gavish et al., 2018; [3]Luo et al., 2020; [4]Pang et al., 2020; [5]Bockel and Rinkevich, 2019; [6]Gibbin et al., 2019; [7]van Treuren et al., 2019; [8]Fick, 1855; [9]Kirby, 2010;

11/12/2020

Let’s design a better poster

A good poster must… be readable



A good poster must… be inviting





A good poster must… make the audience care





ALL posters have the same structure… WHY

Intro – methods – results/conclusions

A possible alternative…

Deficiency of the serine hydrolase PREPL results in impaired regulated secretion

Karen Rosier, Luc Régal, and John Creemers

KU LEUVEN

Congenital PREPL deficiency causes a rare metabolic disorder

growth-hormone deficiency
feeding problems
hypotonia



Patient at 6 months — Child patient

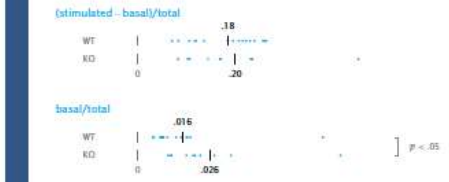
PREPL
- is a homologue of propyl endopeptidase
  - a serine peptidase which cleaves small peptides (less than 3 kDa)
- is a cytoplasmic enzyme — highly expressed in brain, less so in heart, kidney, skeletal muscle
- has confirmed catalytic activity, but no identified substrate

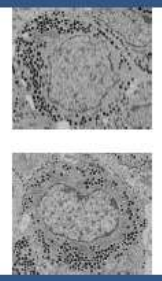
We investigated how PREPL deficiency impairs secretion ⇒ We hypothesize that PREPL has palmitoyl thioesterase activity, removing palmitate from cysteine in proteins involved in regulated secretion

Silencing of PREPL impairs secretion in β-TC3 cells

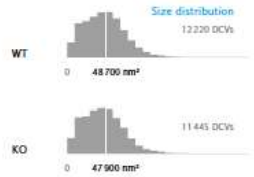


PREPL KO somatotrophs exhibit disturbed GH secretion



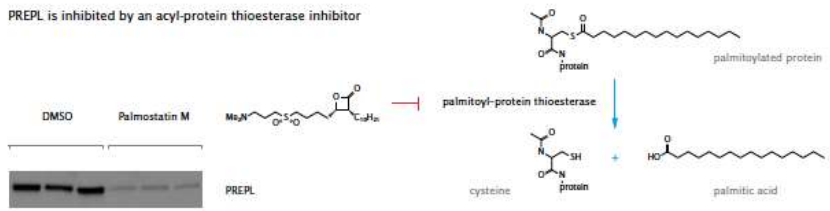


In contrast, PREPL KO somatotrophs do not differ in dense-core vesicles





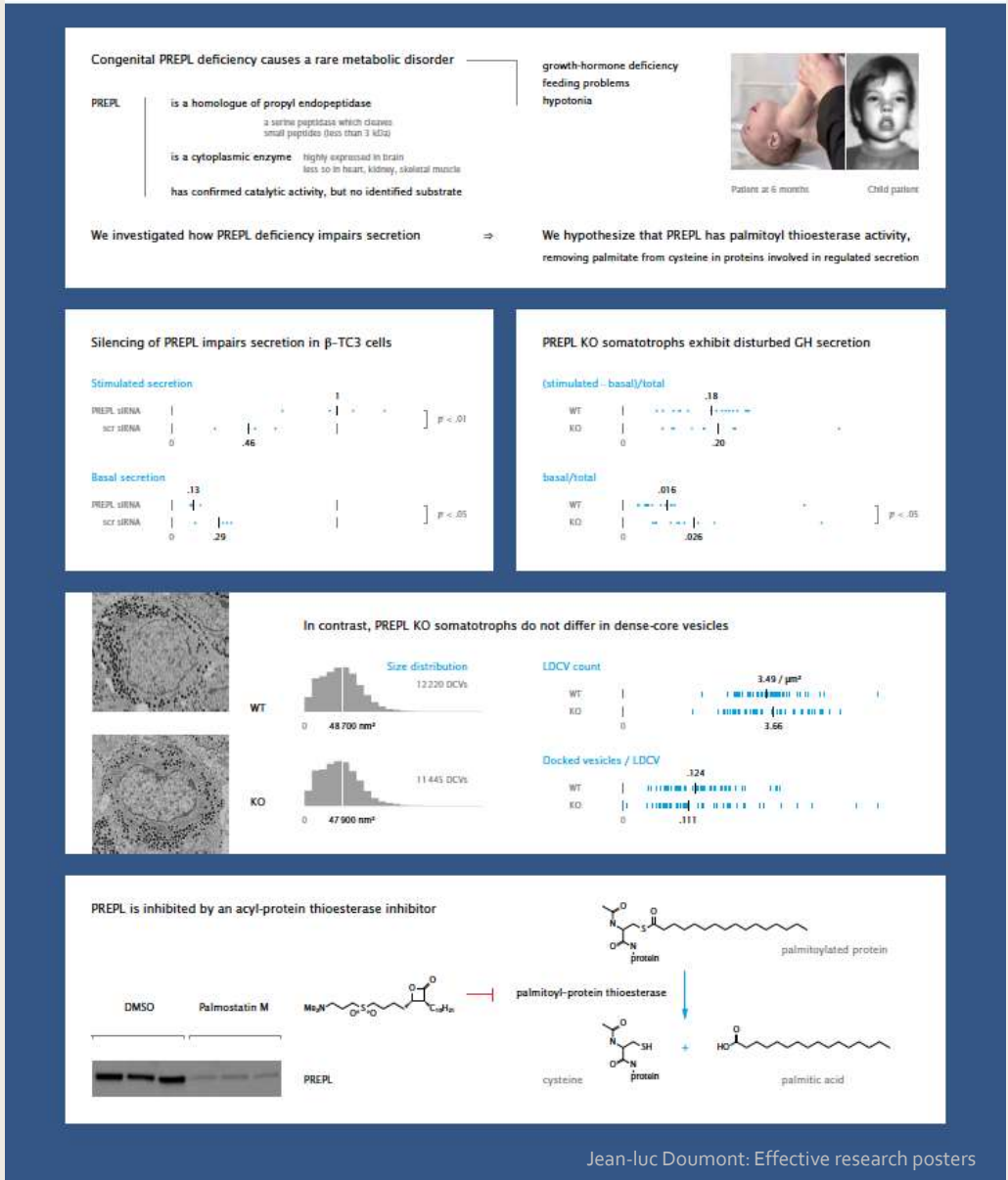
PREPL is inhibited by an acyl-protein thioesterase inhibitor



What

Make audience care
(context, need and action
to address the need)

Messages
(convince the audience
of what you did)



What

Who

Context (make audience care)

Express the need
(in first person)

Express what you did
to address the need

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KU LEUVEN

Congenital PREPL deficiency causes a rare metabolic disorder

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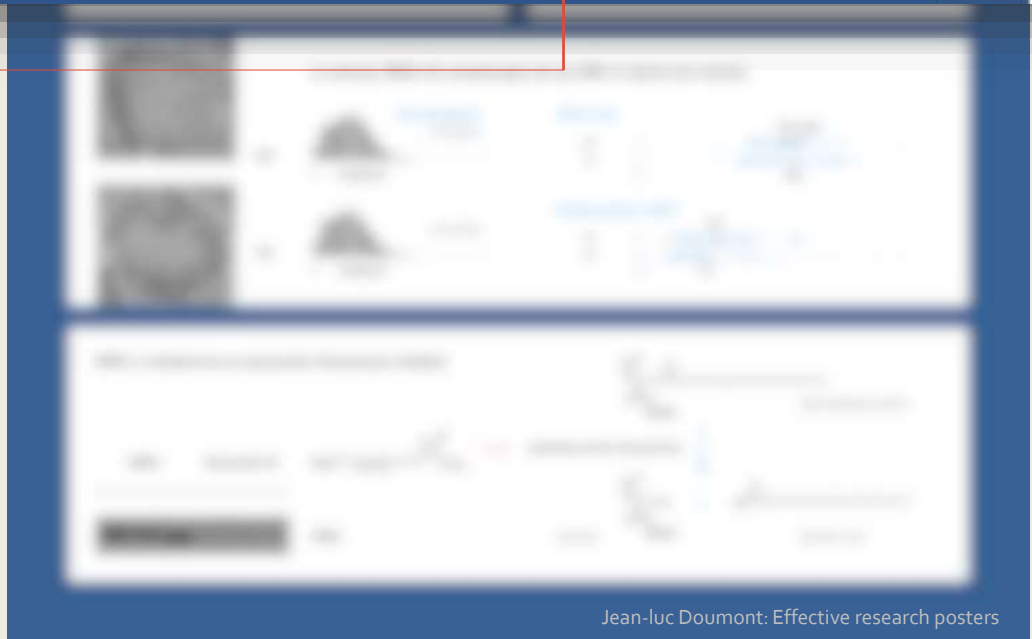
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growth-hormone deficiency
feeding problems
hypotonia



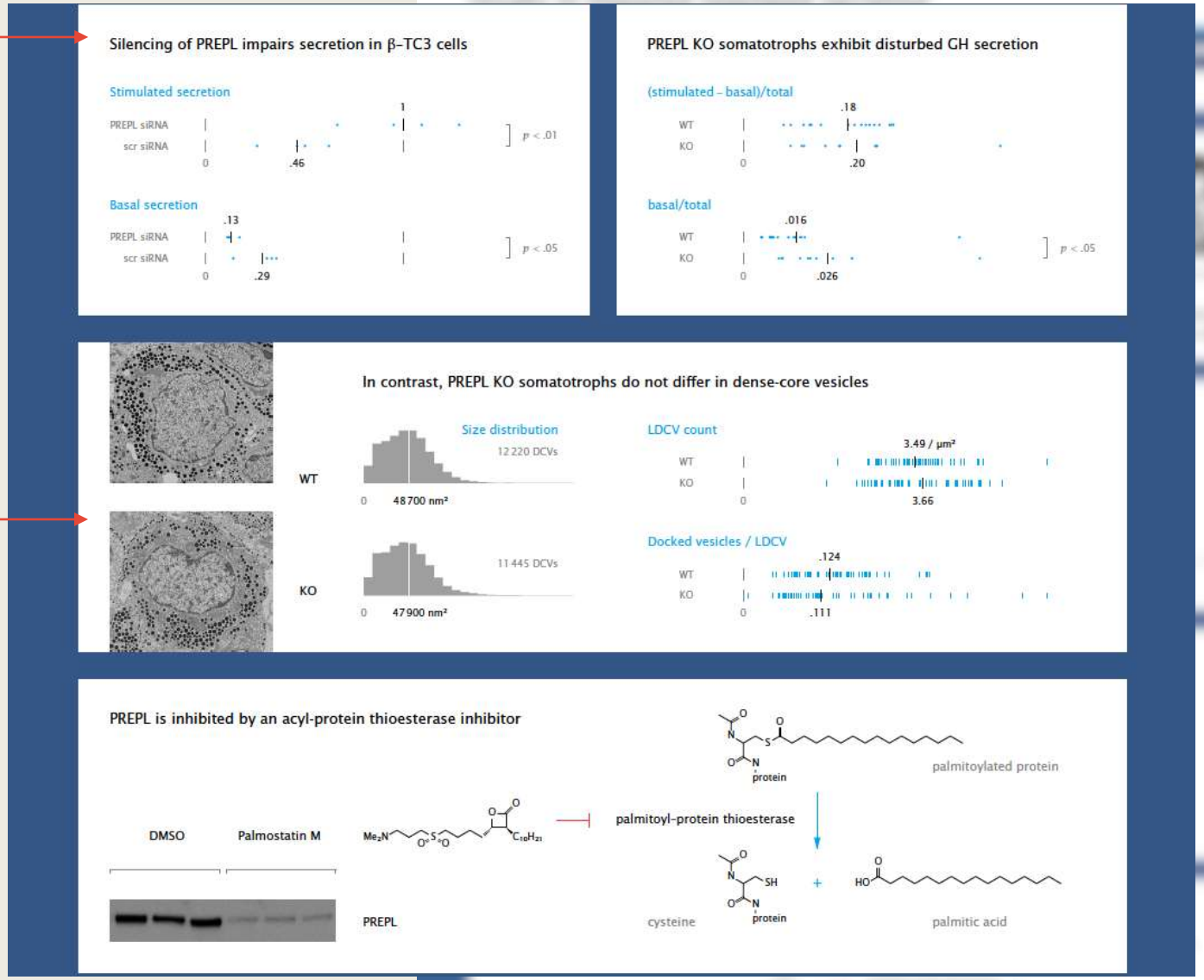
Patient at 6 months Child patient

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State and develop messages

Do it visually



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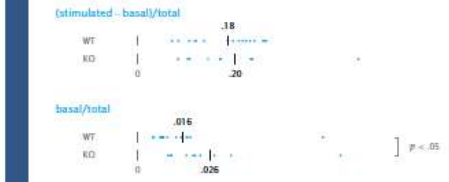
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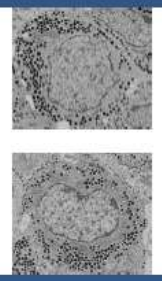
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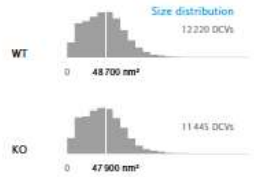


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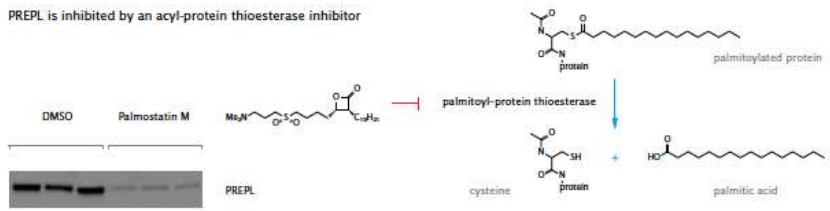


In contrast, PREPL KO somatotrophs do not differ in dense-core vesicles





PREPL is inhibited by an acyl-protein thioesterase inhibitor



The visual design is also important

Let’s learn four basic design principles with which you can go pretty far

..and with a memorable acronym

Contrast

Repetition

Alignment

Proximity

Robin Williams: Non-designer's design book

Let’s apply them
to this poster

PostDoc Latvia

Improvement of dimensional stability of birch wood using phenol-formaldehyde resins

WSE 2020

[redacted]

INTRODUCTION

Birch plywood is widely used in the building industry, construction of transport vehicles, sports gear, furniture, packaging material and toys, but new outdoor applications in high humidity conditions are limited because of the poor biological durability, dimensional and weathering stability. The use of PF resins as an impregnate is a long-known and effective method to protect plywood against wetting and to improve surface hardness, dimensional and weathering stability and expand the biological durability. PF treatment is an alternative to conventional preservation of wood and enhances the resistance to biological decay agents without using biocidal compounds.

THE AIM OF THE STUDY

To use different size of PF oligomers for birch veneer impregnation to obtain the plywood with improved dimensional stability, biological durability and weathering performance. Criteria for birch wood treatment is based on minimum WPG requirements to achieve the maximum improvement in properties, therefore to limit PF resin load in material.

CONCLUSIONS

Treatment with synthesized PF resins significantly improves the dimensional stability of the birch wood by 39-54%. There is a clear trend that increasing the molecular weight of the FF resin used for wood treatment decreases the ASE. The highest ASE values were obtained for resin A (M_w = 292 g/mol), while resin B (M_w=528 g/mol) had lower values and the lowest ASE was for resin C (M_w = 884 g/mol) treated samples. This suggests that lower molecular weight PF resin pre-polymers can better penetrate and fix in the birch wood cell wall, thus providing better dimensional stability. This was also confirmed by the bulking measurements.

*CONTACT INFORMATION

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E-mail: jurisgrinins@inbox.lv
www.kki.lv

EXPERIMENTAL

Materials: Silver birch (*Betula pendula*) wood veneers (100x100x1.5 mm³) and blocks (20x20x5 and 20x20x20 mm³)



Test methods: Weight percent gain (WPG), bulking, leaching (EN 84), anti-swelling efficiency ASE (DIN 52184)

Treatment of wood: In laboratory glass reactor via two-step impregnation with 10% (w/w) of PF resin water solutions



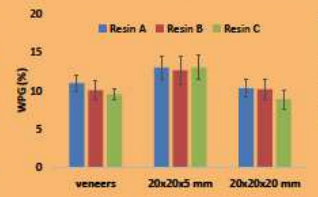
Vacuum step ⇨ Addition of PF solution ⇨ Submersion step

Characteristic parameters of PF resins

Resin	Viscosity (mPas)	Solid content (%)	Molecular weight M_w (g/mol)	Density (g/cm³)	Free formaldehyde (%)	pH
A	75	49.4	292	1.160	0.6	10.0
B	125	50.0	528	1.165	0.4	10.3
C	282	49.7	884	1.175	0.5	10.4

RESULTS

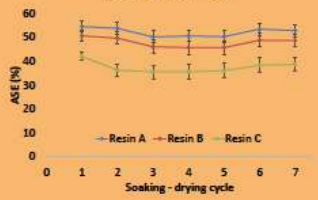
Weight percent gain (WPG) of different size PF resin treated birch wood blocks and veneers



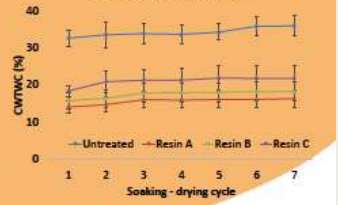
Bulking and WPG of PF resin treated birch wood before and after leaching

Resin	Bulking (%)	WPG (%) Before	WPG (%) After	ΔWPG (%)
A	6.6±1.0	13.0±1.6	10.7±1.3	-17.7
B	5.6±1.0	12.6±1.8	10.6±1.6	-15.9
C	3.5±1.3	12.9±1.6	11.2±1.5	-13.1

Anti-swelling efficiency (ASE) of PF resin treated birch wood



Cell wall total water capacity (CWTWC) of PF resin treated birch wood



Contrast

"If two items are not exactly the same, then make them different. Really different"

This captions have the same font size as the body copy.

PostDoc Latvia

Improvement of dimensional stability of birch wood using phenol-formaldehyde resins

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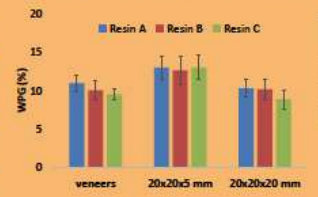
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RESULTS

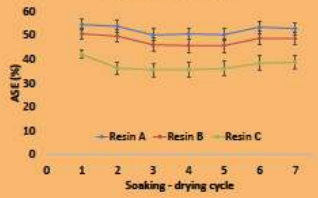
Weight percent gain (WPG) of different size PF resin treated birch wood blocks and veneers



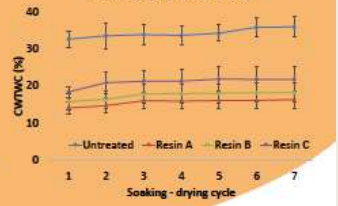
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Cell wall total water capacity (CWTWC) of PF resin treated birch wood



Repetition

"Repeat some aspect of the design throughout the entire piece"

Add some design element that helps create unity. For example, boxes around text or around headings

PostDoc Latvia

Improvement of dimensional stability of birch wood using phenol-formaldehyde resins

[redacted]

WSE 2020

INTRODUCTION

Birch plywood is widely used in the building industry, construction of transport vehicles, sports gear, furniture, packaging material and toys, but new outdoor applications in high humidity conditions are limited because of the poor biological durability, dimensional and weathering stability. The use of PF resins as an impregnate is a long-known and effective method to protect plywood against wetting and to improve surface hardness, dimensional and weathering stability and expand the biological durability. PF treatment is an alternative to conventional preservation of wood and enhances the resistance to biological decay agents without using biocidal compounds.

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CONCLUSIONS

Treatment with synthesized PF resins significantly improves the dimensional stability of the birch wood by 39-54%. There is a clear trend that increasing the molecular weight of the FF resin used for wood treatment decreases the ASE. The highest ASE values were obtained for resin A (M_w = 292 g/mol), while resin B (M_w=528 g/mol) had lower values and the lowest ASE was for resin C (M_w = 884 g/mol) treated samples. This suggests that lower molecular weight PF resin pre-polymers can better penetrate and fix in the birch wood cell wall, thus providing better dimensional stability. This was also confirmed by the bulking measurements.

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Test methods: Weight percent gain (WPG), bulking, leaching (EN 84), anti-swelling efficiency ASE (DIN 52184)

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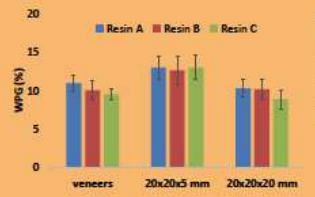
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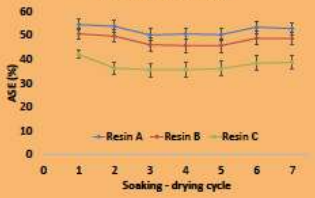
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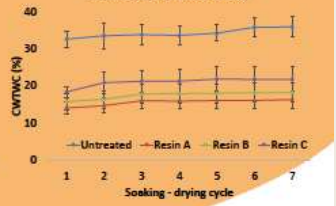
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Alignment

"Nothing should be placed on the page arbitrarily. Every item should have a visual connection with something else on the page"

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This picture is not aligned with the text above



PostDoc Latvia

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WSE 2020

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Proximity

"Group related items together"

Does RESULT belong to the table above or below?

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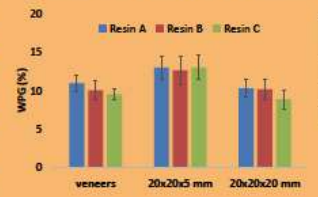
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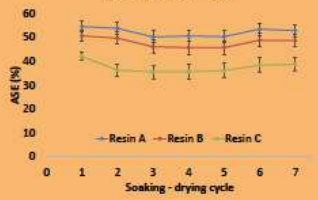
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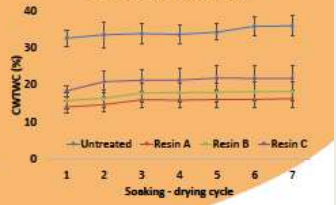
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And don’t forget: grids are your friend

Coral Microbioreactors For Model Validation

Liza M. Roger[1], Isaiah Cuadras[2], Hannah G. Reich[3], Shuaifeng Li[2], Lokender Kumar[4], Jinkyu Yang[2,5], Hollie M. Putnam[3], Nastassja Lewinski[1]

[1]Virginia Commonwealth University, Richmond, Virginia, USA; [2]University of Washington, Seattle, Washington, USA; [4]University of Rhode Island, Kingston, Rhode Island, USA; [4]Colorado School of Mines, Golden, Colorado, USA; [5]Seoul National University, Seoul, South Korea

VCU Chemical and Life Science Engineering, College of Engineering



1. Introduction

Advances in coral biology and ecology are hindered by the complexity of the system (symbiotic relationship with dinoflagellate algae, dense and diverse microbiome) and scales at which different mechanisms operate. While colony-level studies are widespread, there are fewer single polyp scale and cellular level studies (Fig.1). Coral research has mainly been conducted top-down by testing colony response to describe cellular processes. Developing coral-specific microbioreactors can help us change to a bottom-up approach that can have the double function of feeding computational models and validating the ensuing predictions. They can, for example, enable us to investigate protein interactions and gene expression applied to the response of corals to environmental change, toxicity (e.g. microplastics), disease and injury at the cellular level, the polyp level and the colony level.

A number of "coral-on-a-chip" designs have been developed to study micro-scale interactions between corals and their environment but they mainly allow investigations at the polyp scale[1-4] or colony scale (nubbin: colony subset)[5,6]. The device by van Treuren et al.[7] presents the highest resolution by trapping individual larvae in a funnel-like channel allowing single-larvae imaging during the experiment (symbiont expulsion during thermal stress-induced bleaching in symbiotic anemone Aiptasia). Despite the technological advances these devices represent, control of environmental properties and number of replicates remain limited, and the cellular scale has still not been achieved.

The design presented here offers multiple independent input/output channels to control growth media or treatment parameters (flow, temperature, composition), light (for photosynthesis) and live-imaging capabilities (traditional or inverted microscopy) Fig.2-3. It also permits multiple configurations (single chamber or network, Fig.3-4) to study biological interactions at different scale with simple logistics.

Fig.1: Coral scale

Fig.2: Parameters to control

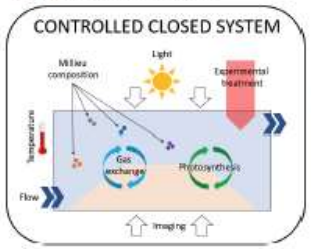


Fig.3: Chamber design

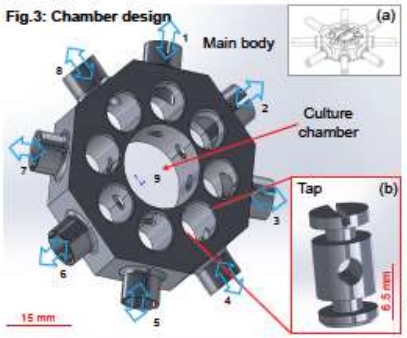
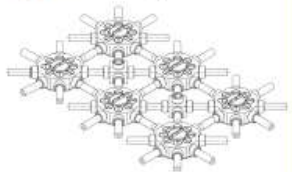


Fig.4: Network configuration



2. Materials & Methods

Chamber design – Reef-building corals require specific environmental conditions (*e.g.* light, temperature, salinity, pH, nutrient, ammonia). This device was designed to enable control over irradiance (transparent material VeroClear®), temperature (external heat source or heated media), flow (9 input/outputs, Fig.3), media composition, photosynthesis, gas exchange and experimental treatment while allowing observation using microscopy (top and/or bottom) Fig.2-3. This octagonal microfluidic device also offers the potential for single or multiple well configuration (Fig.4, well volume: 3.62 cm^3), which allows investigations at multiple scale (cell<polyp<colony, Fig.1), and can be fitted with microsensors. It is easy to make (3D polyjet printer: Objet Eden 260VS, VCU Innovation Lab), setup and transport with potential for field applications.

Microfluidic parameters – Shear stress and velocity fields were modeled using computational fluid dynamics simulations of COMSOL Multiphysics® software. The simulations were aimed at optimizing the device design by varying valve diameter, well diameter and valve length. A flow rate of 2 mL/hour was applied and flow was divided equally across inlets when multiple inlets were used. Furthermore, to model the simulations, a laminar, incompressible flow field was assumed due to the low Reynolds number (RE<<2000) and a no-slip boundary condition was applied to the interior of the device to account for viscous effects.

Simulations also focused on the potential chemical transport through the system in relation to chemical dosing and exposure. For this, 180 mg/L of glucose were modeled with the flow rate of 2 mL/hour. Fick's law of diffusion[8] and the mass continuity equation govern the diffusion of the species through time[9].

Live testing:
Planned for January 2021

11/12/2020

3. Preliminary Results

Computer simulations were essential to model flow and inlet/outlet configurations considering the many options available. Over all the configurations tested, maximum shear stress and velocity remained low (0.62-2.6x10^{-4} m/s and 0.38-3.1x10^{-4} Pa, respectively) Table 1. The time to steady state solution was 5 hours. Variations in well diameter, valve diameter and valve length (Fig.5) revealed larger diameters (well and valve) and longer valves resulted in lower maximum velocity (0.62 m/s) and lower shear stress (0.38x10^{-4} Pa) Table 1.

Photosynthetically Active Radiation (PAR) measurements (dry, Apogee®) show the device lid reduces light penetration to the well by ~30% compared to the external light (Fig.6).

Of the two external heat sources tested for media temperature control only the hot plate setup was successful at reaching and maintaining the target temperature of 25°C (20min).

Further computer-assisted simulations of flow and chemical transport highlighted the need for intermediate connectors in the network configuration to ensure multiple wells can be dosed simultaneously (four at a time, Fig.7). The configuration including connectors showed no significant increases in flow velocity or shear stress inside the culture wells. The highest shear stress (~1x10^{-4} Pa) and flow velocity (0.7x10^{-4} m/s) were observed in the center of the connectors.

Fig. 5: Device internal geometry and shear stress modelling

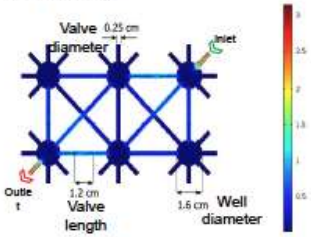


Fig. 6: PAR measurement comparison (dry)

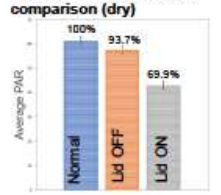


Fig.7: Network with connectors

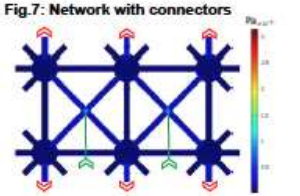


Table 1: Maximum velocity and shear stress (flow rate: 2mL/hour)

	Valve diameter (cm)	Well diameter (cm)	Valve length (cm)	Maximum velocity (m/s)	Maximum shear stress (Pa)
Test 1	0.5	1.6	1.2	**0.62 x10^{-4}**	**0.38 x10^{-4}**
Test 2	0.25	1.6	1.2	2.3 x10^{-4}	2.8 x10^{-4}
Test 3	0.25	1.2	1.2	2.4 x10^{-4}	2.9 x10^{-4}
Test 4	0.25	1.2	0.8	2.6 x10^{-4}	3.1 x10^{-4}



4. Discussion

Although preliminary results are limited and more testing remain the octagon design is promising. We were able to design and tailor a microfluidic device permitting single well and network configuration to study transport and exchanges between multiple "sibling" organisms (or cells). The device's practical aspect means fitting microsensors for continuous measurements will be possible.

Live testing will enable us to check for potential further adjustments, and key parameters/measurements to be uploaded to machine learning platforms currently being developed specifically for the study of reef-building corals.

5. Conclusion

This device presents multiple advantages compared to previously developed "coral-on-a-chip" devices: single well and network configuration, simultaneous dosing of the wells, control over nine inlet/outlets, microsensor retrofitting, top and bottom imaging, minimal flow velocity and shear stress, 3D printable and compact.

The octagon will be an essential part of the feedback loop between experiment biology and bioinformatics focused on reef-building corals. This will facilitate the study of coral protein-protein interactions, calcification, disease & toxicity response, and wound healing from the cellular, polyp and colony level.

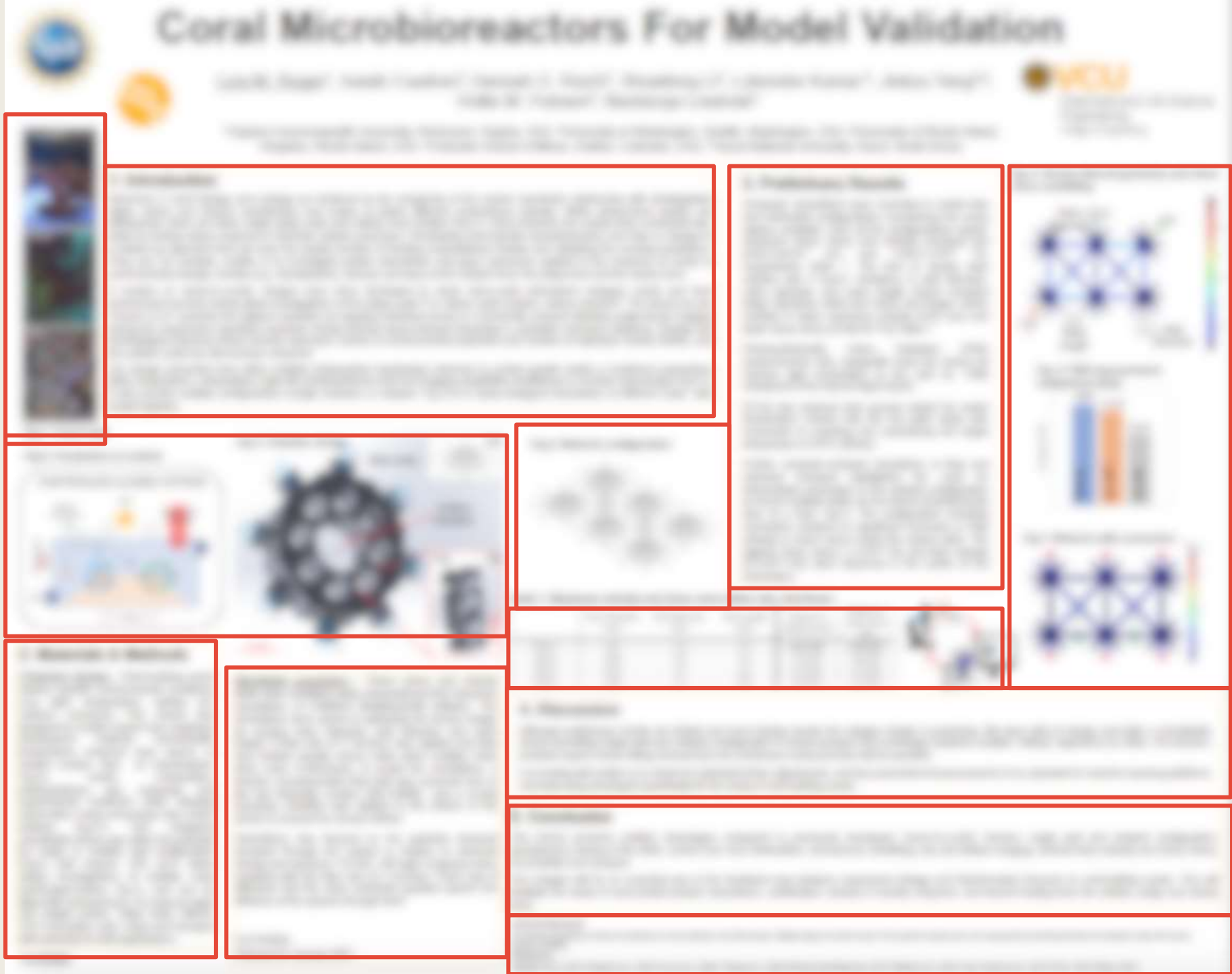
Acknowledgements

The authors would like to thank all contributors to the Synthetic Coral HDR project, Philippe Roger and Adam Hamel. This material is based upon work supported by the National Science Foundation under NSF Award Number 1939699.

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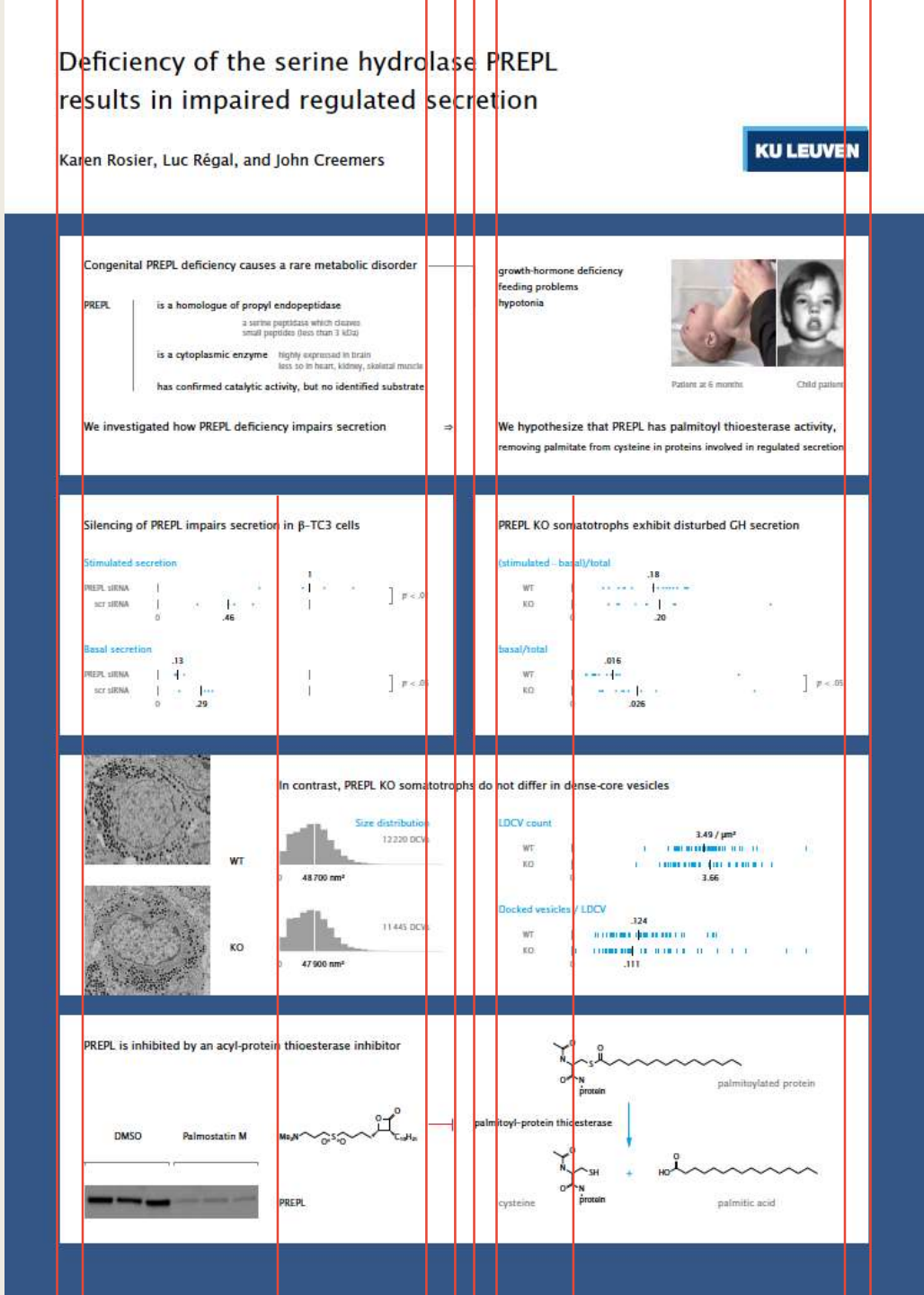
[1]Shapiro et al., 2015; [2]Gavish et al., 2018; [3]Luo et al., 2020; [4]Pang et al., 2020; [5]Bockel and Rinkevich, 2019; [6]Gibbin et al., 2019; [7]van Treuren et al., 2019; [8]Fick, 1855; [9]Kirby, 2010;

This poster does not use any grid so it looks like rather messy



This poster uses a grid so it looks clean and neat.

It helps that there is a lot of white space (designers LOVE white space, that is, empty space around elements)



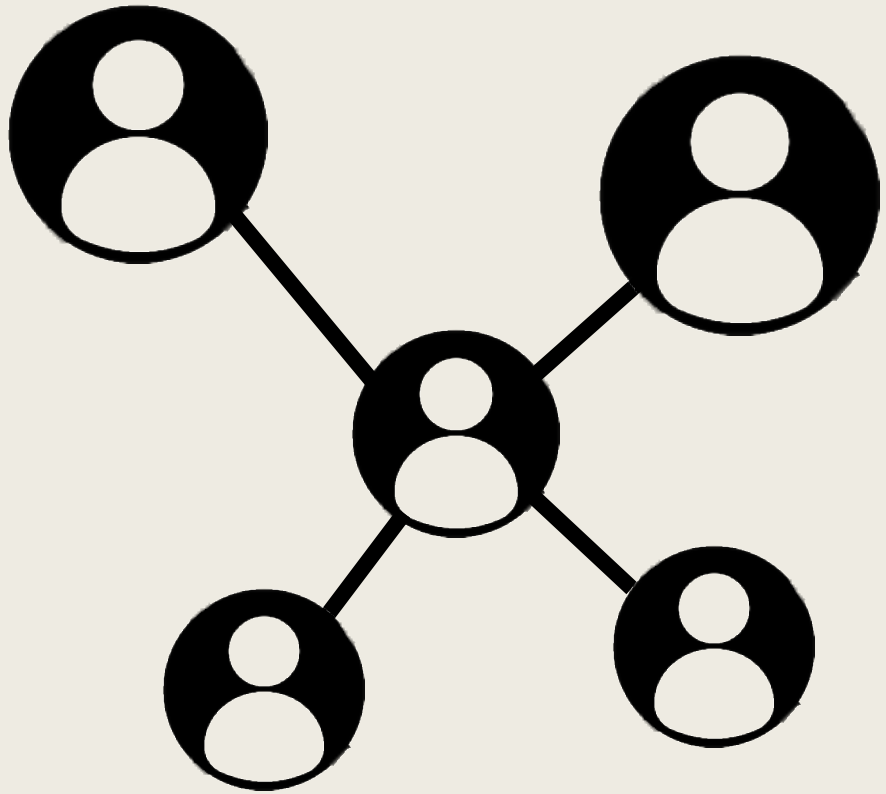
Wrap-up

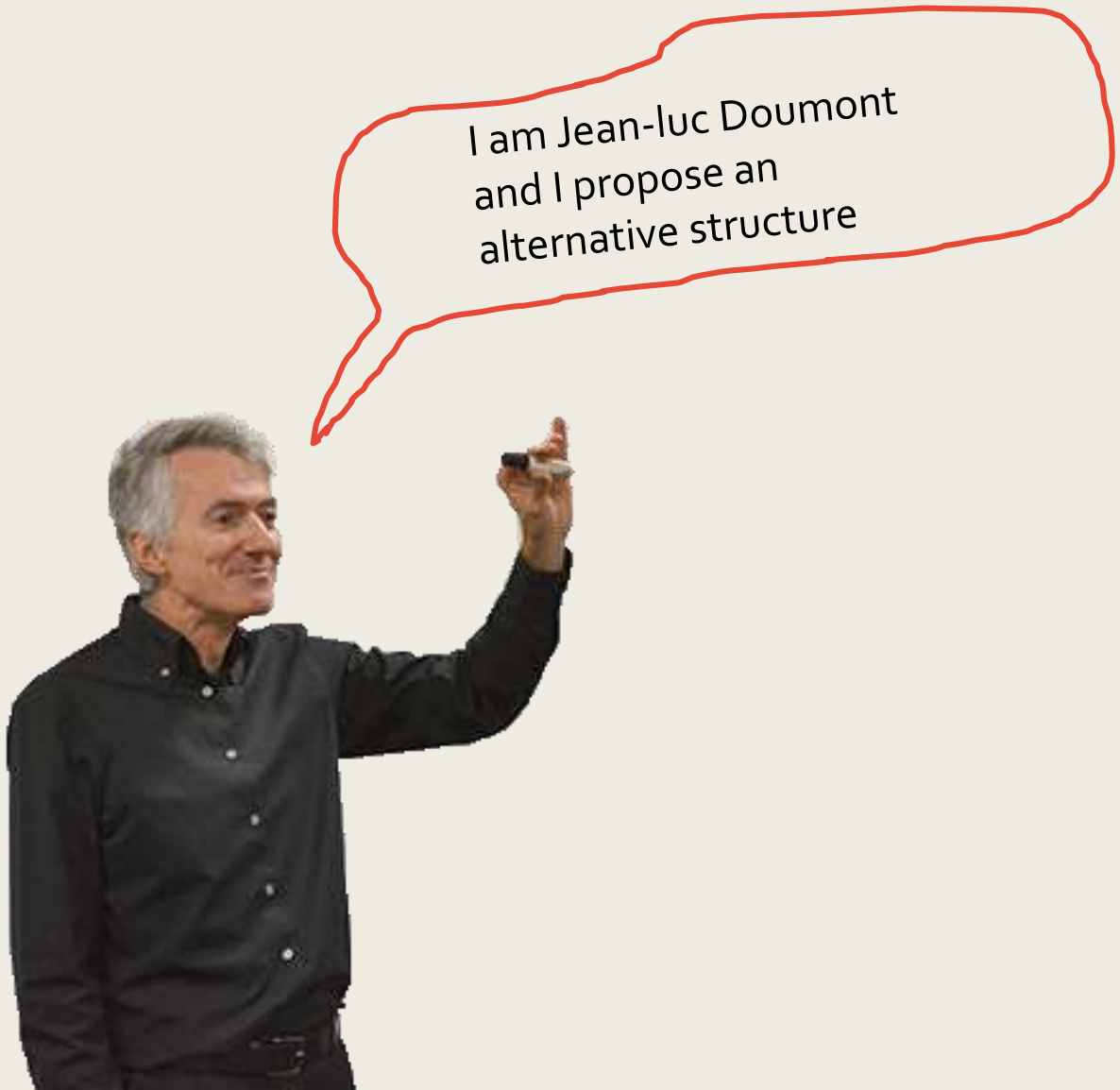
They are definitely…

Second-rate

But with a little effort we can make them first-rate!

The main purpose of posters is… networking!




I am Jean-luc Doumont
and I propose an
alternative structure

Simple memorable acronym to imporve your design skills…

CRAP