



UNIVERSITÀ DI PISA



Women Driving Change in Science: a Quantum Perspective



Marilù Chiofalo
Department of Physics, University of Pisa
LABODIF School
Women for Quantum
INFN

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@ Lab Didattico Fisica University of Bologna



DIGITALLY ENHANCED QUANTUM
TECHNOLOGY MASTER



QUANTUM
FLAGSHIP



QUTE4E



QTEdu
QUANTUM TECHNOLOGY
EDUCATION



qplaylearn



GIANNINA
MAZZINI

GIANNINA
GRALLETTI



States General of
Digital School
@Bergamo, Italy




WOMEN 4 QUANTUM




WOMEN 4 QUANTUM

Observations



SHE FIGURES 2021

About She Figures

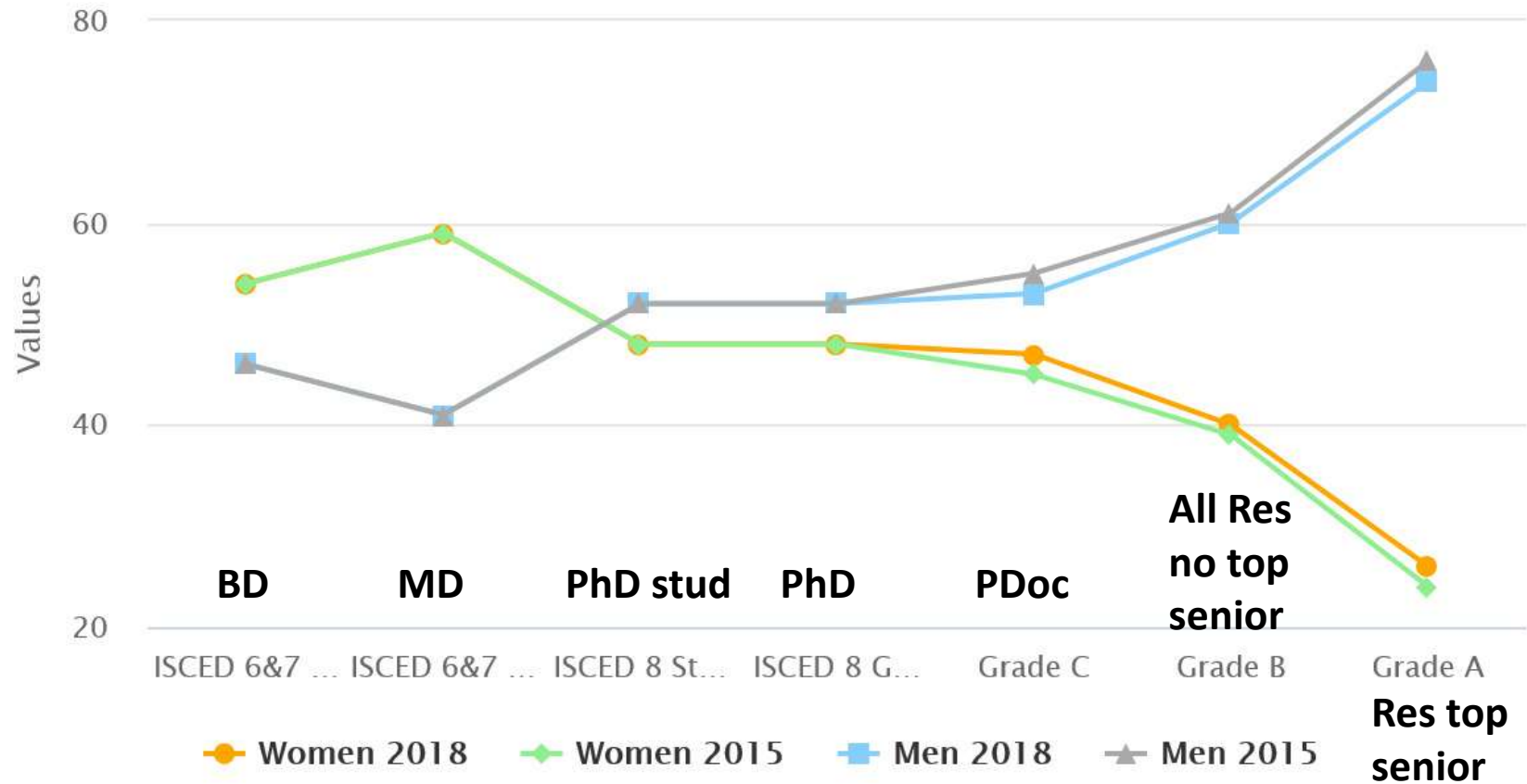
The *She Figures* publication is the main source of pan-European, comparable statistics on the state of gender equality in research and innovation.

The data presented throughout six chapters, follow the 'chronological journey' of women from graduating from doctoral studies to participating in the labour market and acquiring decision-making roles, while exploring differences in women and men's working conditions and research outputs.

Explore the focus of each She Figures chapter below along with some data trends.

Proportion (%) of men and women in a typical academic career, students and academic staff, EU-27

2015-2018



Quantum Flagship Governance

Intelligence gathering

Decision making

Implementation

Advice

**Quantum
Community
Network**

European Commission

Project coordinators

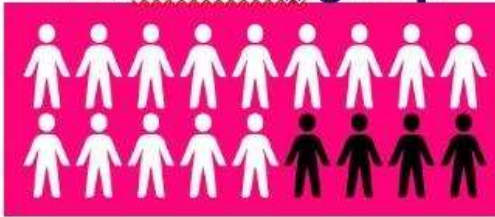
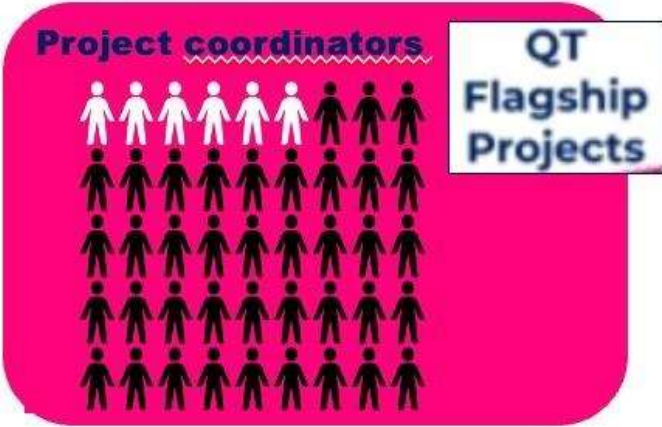
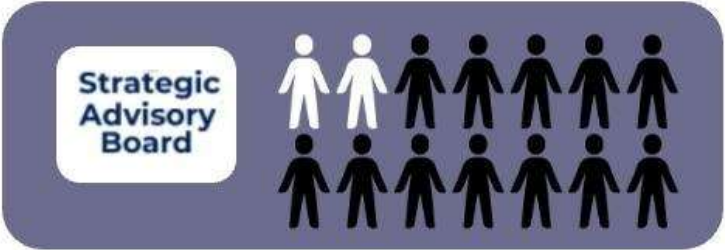
**QT
Flagship
Projects**

QCN member

QCN deputy

**Strategic
Advisory
Board**

EDI working group





Dorothy
Hodgkin

Nobel prize for



PROFESSOR HODGKIN

British wife

By JAMES LEWTHWAITE

A CABLE was sent yesterday to tell Professor Dorothy Crowfoot Hodgkin, Oxford scientist and mother of three, that she has been awarded the 1964 Nobel prize for chemistry. It is worth more than £18,750.



Nobel prize for a wife from Oxford

A HOUSEWIFE and mother of three yesterday won the Nobel prize for chemistry. The award is worth £18,750.

Professor Dorothy Crowfoot Hodgkin, 38, is the first Englishwoman to win a Nobel prize, and one of the few women in the world to do so.

A scientist who has worked since her college days: "Anyone in science will be extremely delighted. She is a very gentle character — but at all a hard worker within."

It is a hard-won reward in the world of science, where the work is often done in secret.

**By Science Reporter
ARTHUR SMITH**





In an interview to *//
Messaggero*
Cristoforetti was
asked

«How many post-it
did you put on the
refrigerator, as you'll
be absent for 5
months. Is someone
running family and
home forward?».

Her answer:

«I have a partner, the
father of my
children, who will
take care of both
running the house
and of our children. I
have to say, he's
been doing this his
whole life. He has
always been the
main reference both
for children's care
and all domestic
things».

Are stereotypes generating
these quanti/qualitative observations?

What do stereotypes are?

What they do imply?



What do stereotypes are and imply?

Etymon: Fixed print (who fixes this print, and why/how/when)?

Error in practice and principle

Make huge economic resources invisible:

huge in quantity: female employment and GDP

huge in quality : wealth of a country for Nobel prize Amartya Sen

different ways in problem solving, innovation, leadership

The fact that they persist even in science only indicates how deep their roots are in a soil of poorly fertile culture generating monsters (malfunctions)

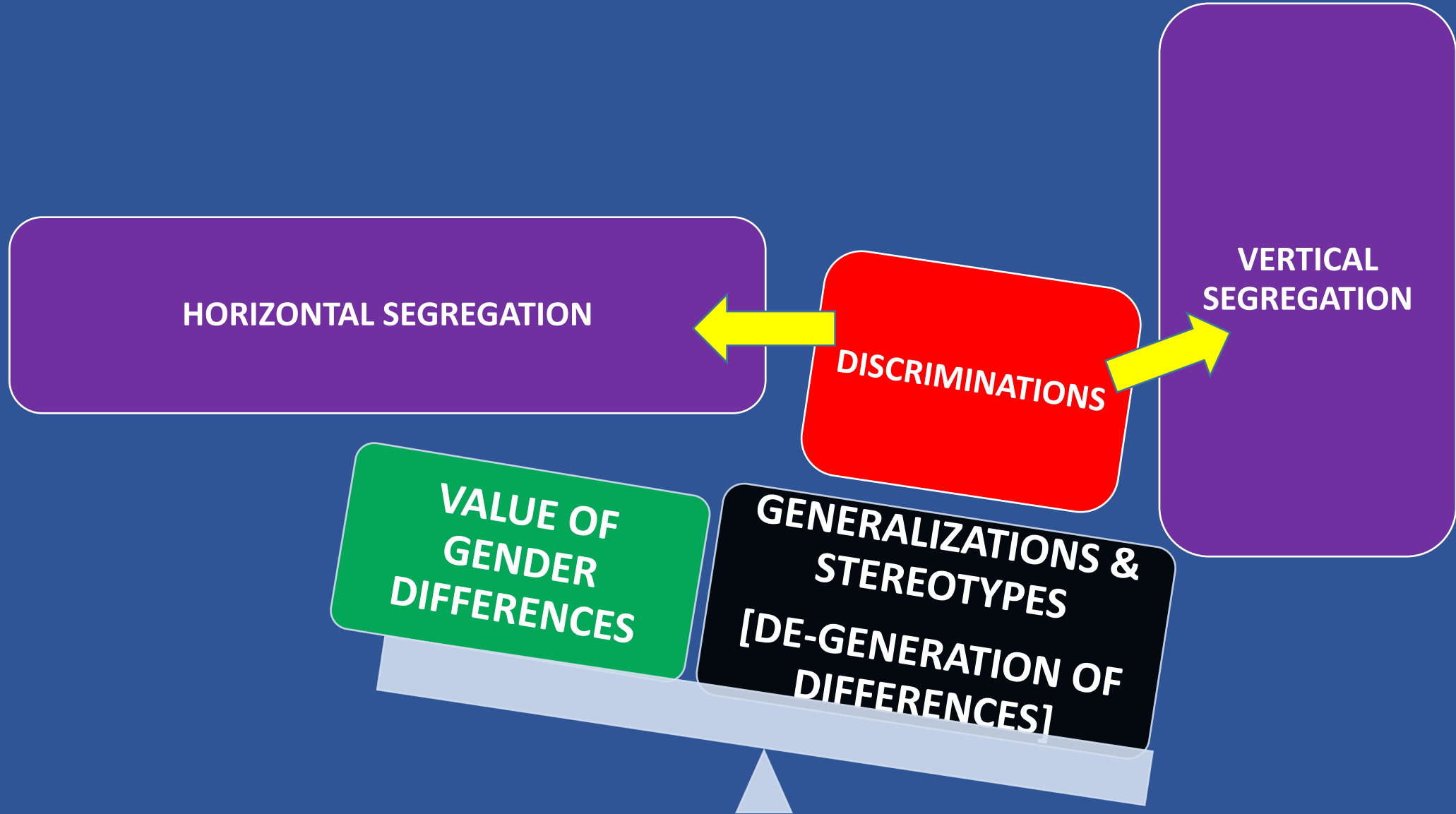
HORIZONTAL SEGREGATION

VERTICAL SEGREGATION

DISCRIMINATIONS

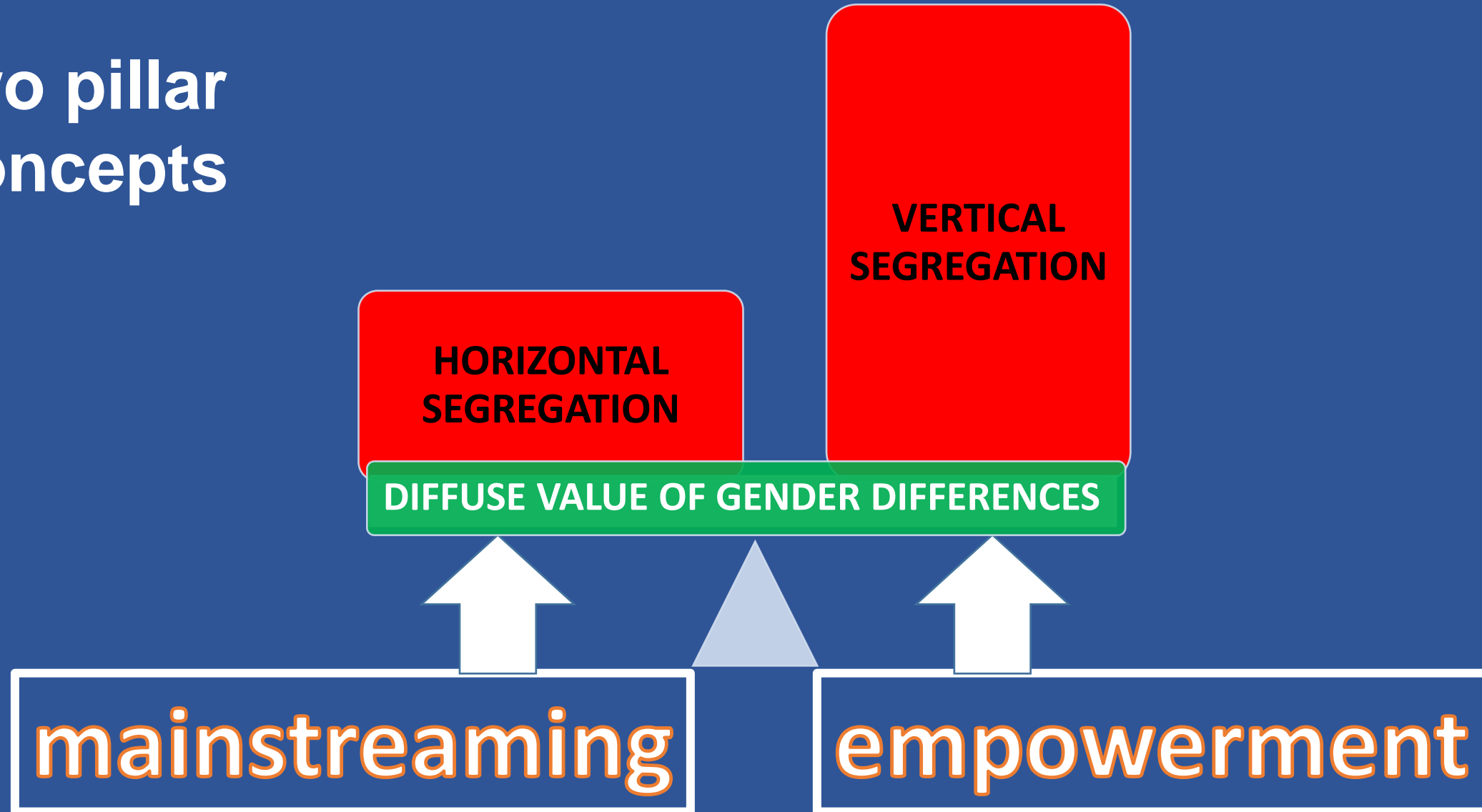
**VALUE OF
GENDER
DIFFERENCES**

**GENERALIZATIONS &
STEREOTYPES
[DE-GENERATION OF
DIFFERENCES]**



95 World Women Conference -Beijing platform

Two pillar
concepts



? Why no real change
is felt so far ?

*... the world and in the world only
... t can be communicated has
... ility.*

*... t is not communicated or
... not be communicated, that has
... been told to anyone and has not
... cted anyone, and sinks without
... ning, is condemned to
... tition.*

*... beats itself because, even if it
... y happened, it has not found in
... 'ty a place to stop''*



annah Arendt

? Are we asking the
useful questions ?

Observations (Take two)



STORIES FROM





**Emmy
Noether**



"I wonder whether the tiny atoms and nuclei, or the mathematical symbols, or the DNA molecules have any preference for either masculine or feminine treatment".

Wu Chien Shiung



*a slow mathematician... you have to spend some energy
effort to see the beauty of math. I don't have any
particular recipe [for developing new proofs] ... It is like being
in a jungle and trying to use all the knowledge that you
gather to come up with some new tricks, and with some
you might find a way out."*

Maryam Mirzakhani

How it happens that authority

May be not recognized in women scientists' presence and career

(which «presence»? which «career»?)

May be more often recognized in «unconventional» careers

(what does «conventional» mean? How evaluated?)



Authority of science

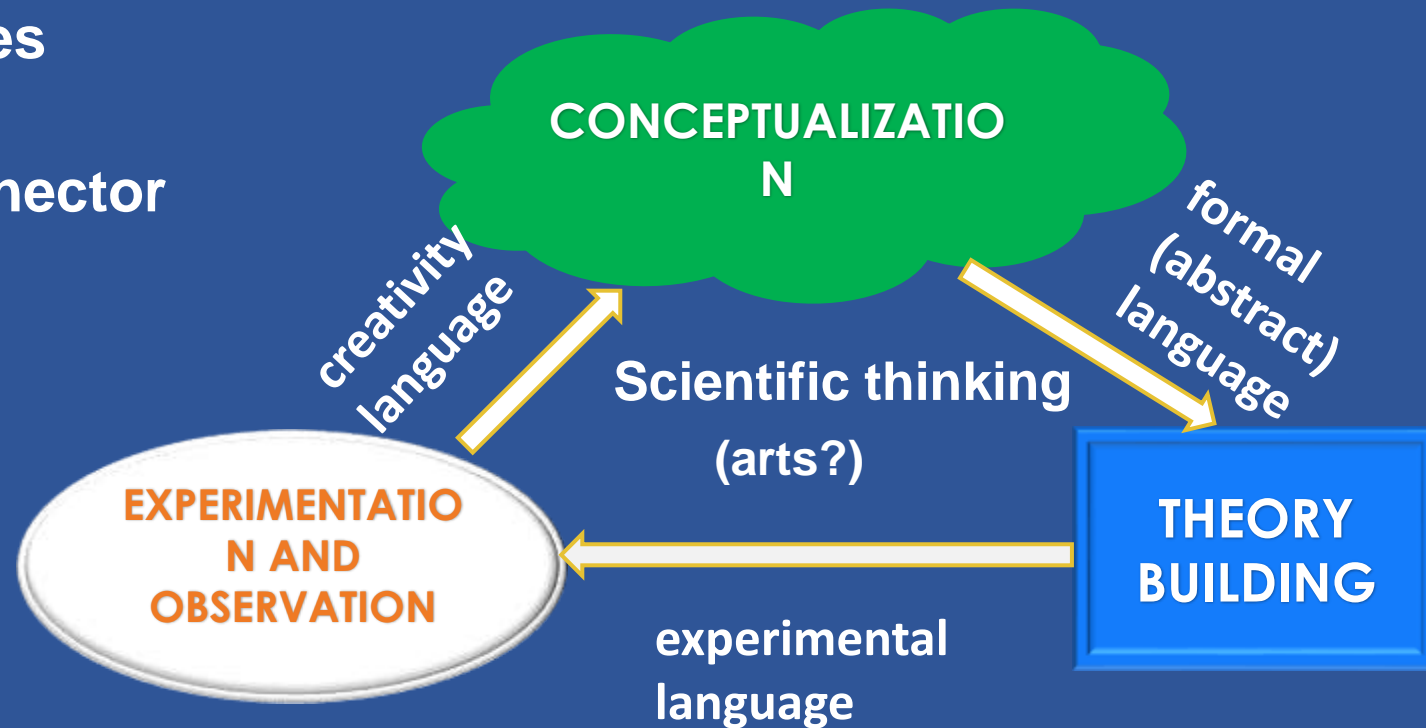
Science has enormous transformative power - well beyond the power of technologies that science generates

Powerful reality-abstraction connector

Creates ideas after reading reality, keeping details and global vision together, using synthesis languages

No absolutely right or false statements, errors are part of the process and perfect it

Progress is a collective climbing on giants shoulders



science for future scaffolding and wishing to reveal the great mysteries of humanity such as the Universe, mind, consciousness, is necessarily:

cross-disciplinary

a puzzle of skills and resources

connecting unrestrained abstraction and concrete applicability

performed in research environments that are complex in terms of size, dynamics and enormous diversity

IS ONLY ME WHO SEES SCIENCE POPULATED MOSTLY BY WOMEN?

Authority of women

ymon. Augere: grow up, nurture

Authority [...] is not the power of tanks, it is not tyranny and domination, the authority has the power to expand the field of what can be thought and said [...] recognize it to women the most diverse in whom I see something not only authentic, profound, experienced and not only theoretical, but something that corresponds to me, awakens in me an echo, satisfies my desire, makes it translatable, and shows me a way through which to practice it"

Gabriella Marsili



"Women should not be defined in relation to men. On this conscience founded both our struggle and our freedom. Equality is an ideological attempt to enslave women at higher levels"

Carla Lonzi

A different «ruler» for Authority

- We believe we are free of thinking, choosing, acting. However we use loads of energies just to stay in an already thought framework, which rules us out
- Our thoughts (every single one) pass through an invisible filter telling us what's right and what's wrong: this is the symbolic order, sorting priorities and our expectations
- The system is so persuasive that colonizes our thoughts and actions: we never go to reality directly but always through this other symbolic order. We act like a body-double
- In so doing, we feel uncomfortable: we always leave somewhere a valuable part of us

To Women in this room: Do you feel ADEQUATE or REBEL (or else)?

To Men in this room: Can you see our acting through this discomfort lens?

- But our thoughts interpret reality: if we change the story, reality changes



Anne Sexton “Tear the canvas”

*...n't know how to be the right woman, I didn't like clothes, cosmetics and silks, I thought I
weird, crazy, different, and you could say I was. Because I was different from the character
ed in the painting that should have been my life [...]*

*...l to live in that painting [...] and in the end I found a way, my way (the poetry) to tear the
as and get out of the picture, my way of saying and understanding who I am: I am a witch, I
crazy woman. I am a person»*



Wislawa Szymborska Writing A CV

What must you do?

*Must submit an application
and enclose a Curriculum Vitae.*

*Regardless of how long your life is,
your Curriculum Vitae should be short.*

Be concise, select facts.

*Convert the landscapes into addresses
and vague memories into fixed dates.*

*When mentioning your loves, mention only the marital,
and the children, only those who were born*

*It's more important who knows you
than whom you know.*

Travels—only if abroad.

Affiliations—to what, not why.

Awards—but not for what.

*Write as if you never talked with yourself,
as if you looked at yourself from afar.*

*Omit dogs, cats, and birds,
mementos, friends, dreams.*

*State price rather than value,
title rather than content.*

*Shoe size, not where one is going,
the one you are supposed to be*

*Enclose a photo with one ear showing.
What counts is its shape, not what it
hears.*

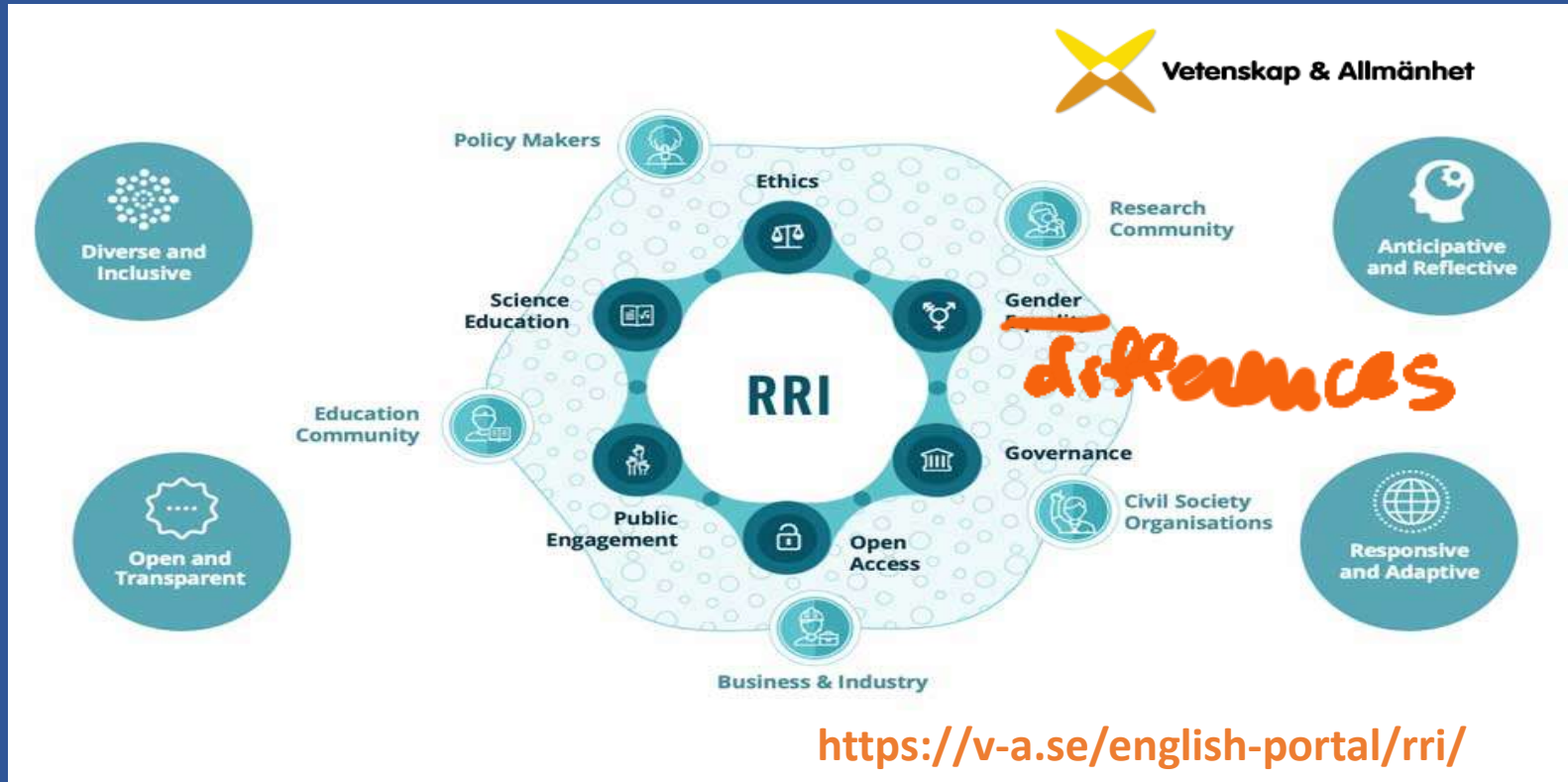
What does it hear?

The clatter of machinery that shreds paper.

What to do Part I

Why now?

Responsible Research and Innovation: an already existing framework



Fostering Mainstreaming and Empowerment (M&E) in:

science teaching, research, outreach, governance

Tools needed: ex-ante and ex-post impact assessment of M&E policies

What to do

How to do



Physics > Physics and Society

[Submitted on 24 May 2024 (v1), last revised 4 Jul 2024 (this version, v2)]

Women for Quantum -- Manifesto of Values

Almut Beige, Ana Predojević, Anja Metelmann, Anna Sanpera, Chiara Macchiavello, Christiane P. Koch, Christine Silberhorn, Costanza Toninelli, Dagmar Bruß, Elisa Ercolessi, Elisabetta Paladino, Francesca Ferlaino, Giulia Ferrini, Gloria Platero, Ivette Fuentes, Kae Nemoto, Leticia Tarruell, Maria Bondani, Marilu Chiofalo, Marisa Pons, Milena D'Angelo, Mio Muraio, Nicole Fabbri, Paola Verrucchi, Pascale Senellart-Mardon, Roberta Citro, Roberta Zambrini, Rosario González-Férez, Sabrina Maniscalco, Susana Huelga, Tanja Mehlstäubler, Valentina Parigi, Verónica Ahufinger

Data show that the presence of women in quantum science is affected by a number of detriments and their percentage decreases even further for higher positions. Beyond data, from our shared personal experiences as female tenured quantum physics professors, we believe that the current model of scientific leadership, funding, and authority fails to represent many of us. It is time for a real change that calls for a different kind of force and for the participation of everyone. Women for quantum calls for a joint effort and aims with this initiative to contribute to such a transformation.

Subjects: **Physics and Society** (physics.soc-ph); Quantum Physics (quant-ph)

Cite as: [arXiv:2407.02612](https://arxiv.org/abs/2407.02612) [physics.soc-ph]

(or [arXiv:2407.02612v2](https://arxiv.org/abs/2407.02612v2) [physics.soc-ph] for this version)

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[v2] Thu, 4 Jul 2024 16:33:29 UTC (313 KB)



WOMEN 4 QUANTUM

* Who we are

First name order:

Ana Predojević, Anja Metelmann, Anna Sanpera, Chiara Macchiavello, Christiane P. Koch, Christine Silberhorn, Costanza Toninelli, Dagmar Bruß, Elisa Ercolessi, Elisabetta Paladino, Francesca Ferlaino, Giulia Ferrini, Gloria Platero, Ivette Fuentes, Kae Nemoto, Maria Bondani, Marilu Chiofalo, Marisa Pons, Milena D'Angelo, Mio Muraio, Nicole Fabbri, Paola Verrucchi, Pascale Senellart-Mardon, Roberta Citro, Roberta Zambrini, Rosario González-Férez, Sabrina Maniscalco, Susana Huelga, Tanja Mehlstäubler, Valentina Parigi, Verónica Ahufinger.

Women for Quantum (W4Q) is a group of female physics professors based in Europe but also in Japan, working in the fields of quantum optics, atomic and molecular, condensed matter, and quantum information. All of us have a background in physics and have more than 10 years of professional experience, including a PhD.

We have initiated numerous initiatives aimed at improving gender equality in the field and making our professional environment more inclusive and supportive.

We understand that most of these initiatives are ineffective in achieving their goals.



What this Manifesto of Values is about

- We value using words and images that have the power to transform reality, creating an inclusive and non-discriminatory, e.g. non-gender-biased, scientific community.

- Freeing our community from microaggressions, harassment, and any other degrading behaviors and practices that result in making women invisible or even just uncomfortable. Reports from many universities consistently show that women are more exposed to such discrimination and practices than the average. Additionally too many of us have personal stories or know colleagues who have experienced serious misconduct, damaging women's careers. This misconduct ranges from belittling, to sexist comments, to actual harassment. We seek to raise awareness across the whole scientific community about the current situation and strive to put an end to it.
- Fostering, empowering, and implementing a different approach to evaluating quality in science. We believe it is crucial to assess not only the scientific output but also the process and journey leading to it. Therefore, we advocate for measures that go beyond relying solely on numerical metrics like the h-index or citation counts, also acknowledging the existence of diverse career paths. In recruitment and funding processes, we advocate for assessing capabilities in teamwork and valuing one's ability to create a healthy scientific ecosystem, in addition to technical and managerial abilities.

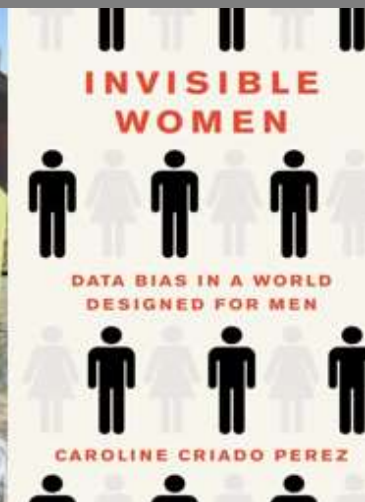
Gender-bias, including unconscious, is a well-documented phenomenon that affects the recognition and access of female scientists to financial resources, promotions, publication in high impact journals, among other areas. Our goal is to raise awareness on this phenomenon, and to enforce effective measures to address it in its various, even subtle, forms.

“ We aim at achieving a true change. The first step is to acknowledge the unsatisfactory current situation of women in quantum physics. Existing measures have not enough impact. ”

“ The change we seek will benefit all under-represented communities as well as the quantum ecosystem as a whole. ”

Acknowledgements

We would like to thank the many colleagues from (quantum) physics and the quantum industry, in particular the (first) endorsers of our manifesto, for their support and discussions over the past years.



all this very moment in the Alps and I had immediately associated this particular snapshot with your Manifesto of values <https://arxiv.org/pdf/2407.02612> that you raise this gender issue so important to our community.

Right, the life and the scientific career is more difficult for women. Are you aware of the book by CC Perez (Caroline Criado Perez)? It inclines us (i.e. the males) to think more about the issue but it is also important not only to think but to do something about it.

[A male physics professor of the quantum community]

Dear Madams,

I am writing to you following the publication of your manifesto. I must say that I have been very touched and impressed by your action. I am currently a master's student in Quantum Engineering in Paris, and I would like to continue in research. Seeing your publication, along with the list of all those (so many!) female researchers as signatories, filled me with hope.

Therefore, I would first like to thank you for what you are doing, and especially, I would like to ask if there is any possibility to contribute, to help, even at my student level. I would be very motivated.

I wish you a very good day,

Best regards,

Dear Dr. Chiofalo,

I read the Women for Quantum – Manifesto of Values posted to the preprint arXiv today. Whereas I do not seek to be formally involved in whatever actions your group decides to take as I am neither a woman nor in the field of AMO, I will encourage my colleagues and all of my students to read the document. I know that too often men in my position claim to want change but cite a lack of power as a reason to not act. That, if I may be blunt, is bullshit.

I shall keep my eye out for further work from W4Q, particularly if the group makes its way to the US. It is unfortunate and unfair that you needed to write it, but thank you all for creating and posting the manifesto. I hope it will inspire the community to make long-overdue structural changes.

Best regards, *[A male physics professor of the quantum community]*

To be

continued...

Thanks Everyone
for this journey
together

Marilyn



Thank
to
my Team!

What to do Part II

Why now?

What to do

How to do

pensare il successo 1

Giulia: Lavoro di squadra e creatività in Il piano ciò che è messo in primo piano è ciò che è più misurabile. L'università è mossa dal «profitto». Come vengono valutate le università? Se si cambia questo, magari mettendoci altri criteri sulla qualità della vita etc., si può riflettere al livello individuale.

Marta: ok dall'alto ma deve anche venire dal basso, dovremmo riscrivere il successo sin da piccole/i per esempio successo è fare benissimo in un solo ambito.

Giovanna: dal basso. Come radice non è un problema di genere ma di struttura. Il successo della scienza è confuso con il successo dello/a scienziato/a. Qual è una buona

Giulia: alle donne viene insegnato il successo da piccole in un modo che è maschile.

Si discute dei circoli viziosi rispetto alla visibilità.

pensare il successo 2

Clarissa: Definizione di successo: per me è una persona che sa dialogare con altri/e e che non mette necessariamente la propria esperienza personale come filtro

Federico: pubblicare e h-index anche a prescindere dalla qualità e senza guardare alle capacità umane per es. nel gestire il gruppo di ricerca.

Elena: cosa significa carriera non convenzionale

Francesca: Successo verticale e non mi ci sono mai troppo riconosciuta: l'ambiente mi crea dei microdisagi che cerco di neutralizzare muovendomi in orizzontale (interdisciplinarietà grazie a Olivia). Interdisciplinarietà nasce da disagio (ricerca)

Micol: carriera non convenzionale. Segregazione verticale e orizzontale: intelligenza focalizzata o trasversale. Successo = carriera?

Vito: l'università diventa specializzazione

Olivia: gerarchia tra i settori. Profilo di successo: percorsi di soddisfazione. Ricerca come processo non solo come risultato. Misurabilità del successo prevale rispetto al successo stesso (ANVUR e bibliometria in discussione ma in modo folle). Misurare la persona e il sistema.

scare il successo 3

na: carriera non convenzionale e quindi mi sentivo di meno, ma ho vissuto tante cose differenti e penso di avere molto

ccesso: molta conoscenza di molti argomenti, sono empatica, più sicura perché avuto tanti problemi che ho superato. Essere adri confligge con la carriera.

essia: interdisciplinarietà andrebbe più valorizzata (mentre si viene valutati/e molto sulla memoria e con la qtà di tempo che si dedica allo studio rispetto ad altre cose). P.es. fare esami valutando altre cose.

aria Lucia: mondo accademico è una persona che pubblica tantissimo però durante il mio percorso di studi penso che un profilo di successo per la persona e perché stia bene è che sia solo la strada accademica. Rispetto al genere, empowerment in altà rimane carriera

renzo: profilo di successo penso a persone che non hanno seguito percorsi lineari, che non separano la disciplina da ciò che c'ò intorno. Nella mia esperienza, la magistrale di didattica ha permesso a tante persone che hanno ritrovato la strada accademica.

ccesso rispetto a chi e cosa? Ciò che ci si aspetta da se stessi o società (esterno o interno)

artina: avvilente è la performatività e i tempi che vanno rispettati, «devianze» non ammesse, non sembra esserci spazio per gente che non sia studiare ecc. a tempo, fare passi indietro viene visto come fallimento (leaky pipeline)

ovanna: la visione di successo che c'è mi fa paura e crea ansia, trovare subito la strada. Sentire queste storie oggi è molto in cuorante. Andrebbe ricostruita questa non-convenzionalità. Scienza come sacrificio è soffocante: è la narrazione prevalente. decostruita.

ulia: successo è far risuonare quello che studia e la carriera che vuole con gli aspetti del suo carattere e le sue passioni, dare il o tocco personale e naturalmente va in contrasto con tutto quello che abbiamo detto.

via: soggettività e percorsi diversi è difficile definire il successo in modo standard. Siamo ancora molto con la visione adizionale dei risultati ed è il pensiero che ci rimane in testa

lone: quando da piccolo ho dimostrato di avere predisposizione a studiare mi è stato detto che dovevo avere successo e se no ludi come se tu stessi sprecando un dono e quindi non ci si può autodeterminare.

A different «Hidden» Intelligence

Ductile, concrete, visionary, knows by exp how to make mistakes and recover, feels, is able to *read between things* more than *inside things* (=intus-lègere)

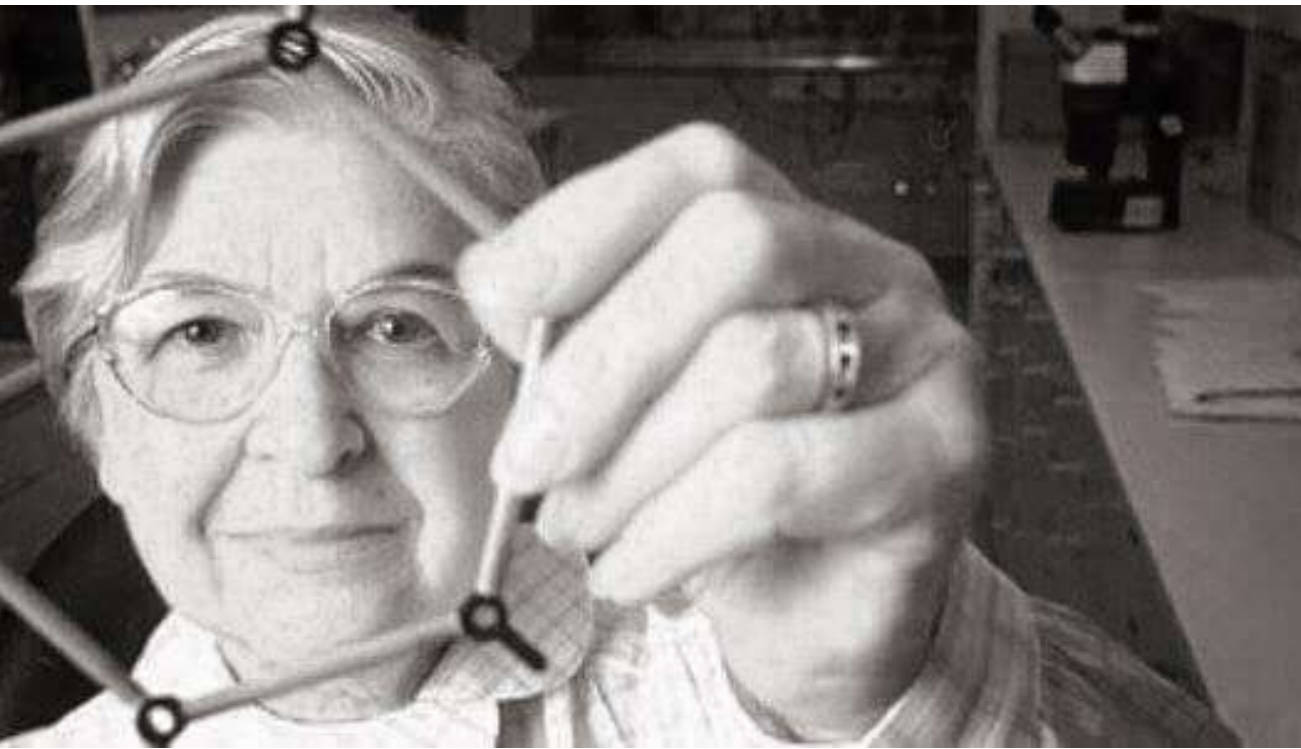
We use it thousands times everyday without crediting it: each time we down-pin rigid abstract rules of *logos* to a soft and movable reality of complex lives (subjectivity vs. objectivity, unconventional careers – e.g. interdisciplinary and other examples)

It has a high relational content providing a different ruler/meter

Uses substantial words and assigns high value to experience, *chronos* vs. *kairos*, what and how value (external vs. internal, impostor syndrome, competition&competition), freedom (external vs. internal) individual vs. collective, results vs. path, separate vs. keep together (mind and body too)

Not coded, not even recognized: needs to be studied, authorized, legitimate

*“It’s a sort of intelligence capable of the enchantment of the CHILD
with the wisdom of the adult” Gianna Mazzini*



Stephanie Louise Kwolek

*Don't think there is anything more satisfying than
improving someone's life. This is happiness"*