EXPLORING, PARTICIPATING AND CONSTRUCTING COMPLEXITY: HOW A COMPLEX COMPLEXITY SCIENCE LOOKS LIKE TO A CURIOUS FAMILY PSYCHOLOGIST

ANA TEIXEIRA DE MELO

E-mail:anamelopsi@gmail.com

8th May, 2015, University of Warwick

Center for Social Studies, Associate Laboratory, University of Coimbra
Faculty of Psychology and Education Sciences of the University of Coimbra
Post-doctoral research fellow, funded by Foundation for Science and Technology (SFRH/BPD/77781/2011)

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FCT Fundação para a Ciência e a Tecnologia MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA

POPH QUALIFICAR É CRESCER.

QREN QUADRO DE REFERÊNCIA ESTRATÉGICO NACIONAL PORTUGAL 2007-2013

GOVERNO DA REPÚBLICA PORTUGUESA

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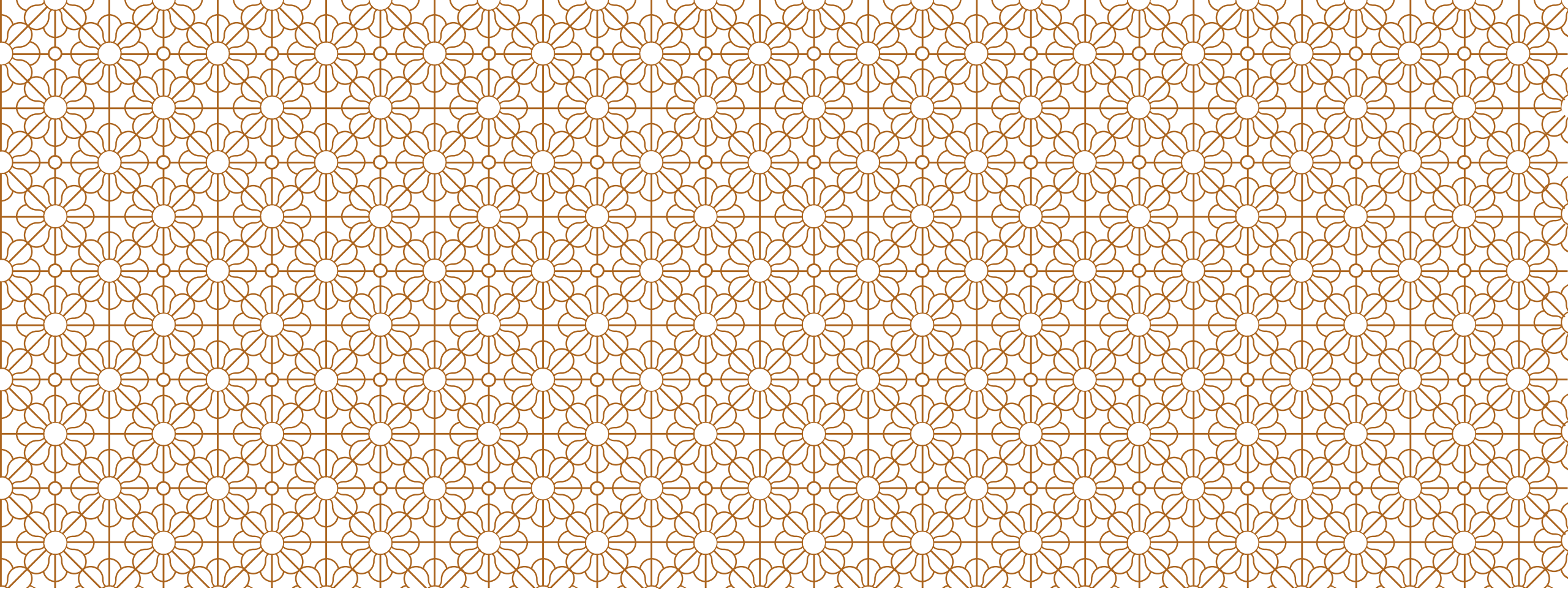


COMPLEXITY SCIENCE

Reflexions on the evolution of the complexity of a science of complexity

COMPLEXITY: A DEVELOPING SCIENCE

- Progressing from a “new” field of research to the status science and a relatively established paradigm, with features of a “normal science” (Kuhn, 1962) at least in some fields, particularly in the natural sciences

- Capable of providing science the tools to investigate and understand and conceptualize its own functioning (Morin, 1990)

- Complexity as much an **object as a subject** of Complexity Science

- Science(Complexity) Science as a self-organizing system (Fuchs, 2004)

DEVELOPMENTAL RISKS

- Being trapped in “normal science” and hypothetical-deductive modes of reasoning and research
- “Technical” and “Pop” “Degradation (Morin, 1990)
- Neglecting fundamental, overarching questions, and to integrate focalized research into a wider theoretical and empirical landscape
- Risks of ignoring a multifaceted identity with many “Complexities” which need not be excluded nor fused, but call for integration to avoid the risk of becoming either a Split or an Holistic Science

DEVELOPMENTAL RISKS

- Specific risks for Social/Psychological Sciences
  - Poorly reflected and acritical acceptance of imported concepts
  - Blended/blurred identity- a fusion with the “manners” of other fields may obscure important unanswered questions about Human Complexity and lead to a focus on the “wrong questions” (preference for strategic vs fundamental questions)
  - Blind importation of methods and techniques and the “bending” of research questions and matters of interest to match the methods instead of otherwise

DEVELOPMENTAL OPPORTUNITIES

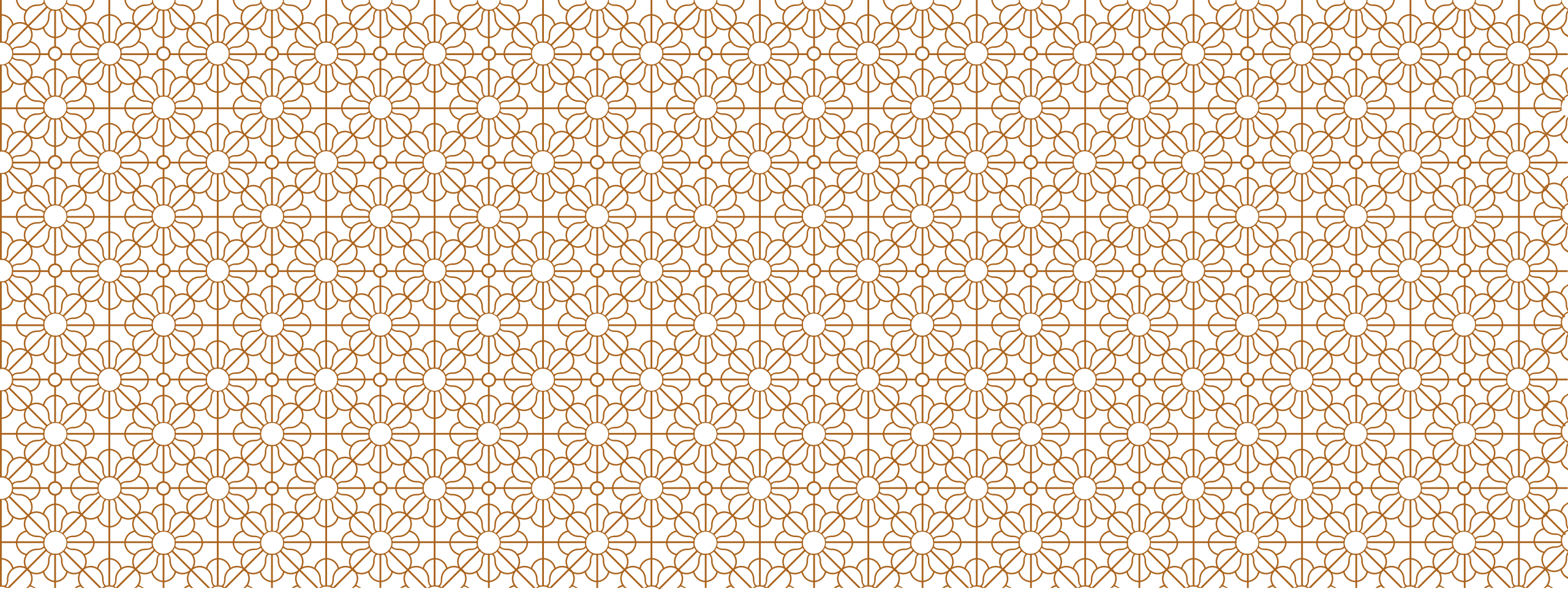
- Exploring the potential to become a science that does not exclude but Integrates and promotes its own development (differentiation and integration)
  - Integration of levels of understanding and perspectives (diversity)
  - Capable of establishing distinctions and articulating (Morin, 1990) parts and wholes (disciplines), into *complexus* of a Science which is One and Many Growing to fulfil a complex epistemology based on complex "thinking" (Morin, 1982, 1990)
  - Capable of avoiding closure in "restricted complexity" modes (Morin, 2007) and embracing truly complex questions difficult
  - Aiming for "the pattern which connects" (Bateson, 1979)

DEVELOPMENTAL OPPORTUNITIES

- Taking advantage of the **relative stability** offered by the more or less "normal" mode complexity science and its strategic side

- Exploring horizontal/quantitative development through hypothetical-deductive and quantitative and qualitative inductive modes of reasoning

- Exploring for **fluctuations** and **instabilities** potentially leading to **novelty in** the form of qualitative transformations
- Vertical/qualitative development through abduction and explanatory induction



EXPLORING

Exploring
Expanding
Transforming
Complexity

EXPLORING

- **Charles Peirce** (1839–1914) **and the logic of discovery: Abduction**

"Every single item of scientific theory which stands established today has been due to abduction"

Abduction or hypothesis as a form of explanatory inference

- **Abductive Inference**

"A surprising fact C is observed,

But if A were true, C would be a matter of course

Hence, there is reason to suspect that A is true"

(CP, 1903, 5.189)

EXPLORING

- **Perceptual abduction** (as extreme form of abductive inference)

"A well-recognized kind of object M1, has for its ordinary predicates P1, P2, P3 etc., indistinctely recognized.

The suggesting object, S, has these same predicates P1, P2, P3

Hence, S of the *kind* M"

(CP, 1891)

EXPLORING

- **William Rozeboom (1956-…): Explanatory or ontological induction (1961, 1997)**

"El (...) tendency to make inferences from observed patterns of data to the existence of theoretical entities (...) that could explain *why* the data are patterned this way (Aogáin, 2013)

Theoretical entities are mentioned as states, qualities, dispositions but may be thought of as processes, principles, complexes or order parameters

"What *kind* of thing must this be that it should appear to us this way?"

EXPLORING

•Most major scientific advances in science result from abductive and exploratory/discovery modes of reasoning

But where do these novel ideas emerge from?

•Most major advances steam from one of the most fascinating features of human existence: creativity (Boden, 2004)

"Creativity is the ability to come up with ideas or artefacts that are **new, surprising** and **valuable** (Boden, 2004)"

EXPLORING COMPLEXITY:

"The act of abductive suggestion comes to us like a **flash.** (...) It's true that the different **elements of the hypothesis were in our minds before;** but it is the **idea of putting together what we had never before dreamed** of putting together which flash the new suggestion, before our contemplation"

(CP, 5.157, 181, 184-5, 1891)

- "Creativity lies essentially in the way in which the subject **relates the elements available** in the different realms of his or her experience" (nubiola, 2005, p. 126)

EXPLORING: TYPES OF CREATIVITY (Boden, 2004)

- Combinatorial creativity
  - Unfamiliar connections of familiar ideas
  - Requires “rich store of knowledge”

- Exploratory creativity
  - Exploration of the limits of conceptual spaces; adding variations and “new tricks” to repertoires; explore less visited locations; exploration as the start of non-combinatorial creativity

- Transformational creativity
  - Transformation of conceptual spaces, overcoming their limits

EXPLORATORY PRACTICES

Surprise, novelty, and creativity, as a process of "breaking up habits and acquiring new ones" (Gonzalez, 2005), closely connected to abductive inferences where new ideas are organized in the form of hypothesis (Gonzalez, 2005; Nubiola, 2005)

- Great creative leaps necessitate the **nurturance of a rich and complex intellectual space** where concepts and ideas are experimented in relation to each others, where **ideas about these relationships are nurtured**

EXPLORATORY PRACTICES

- Exploring abductive processes, and the logic of discovery, with a focus on **strategies and methodological processes** (Paavola, 2004; Hintikka, 1999, cit in Paavola, 2004)

- **Exploring Variation/differences** and **comparative practices** have been at the heart of qualitative social science (Palmberger & Gingrich, 2014) and at the core of some proposed heuristics of discovery for the social sciences (Abbott, 2004), more of **less informed by previous theories**, as core elements of methods oriented at theory-building (Glaser & Strauss, 1967; Charmaz, 2006) and heuristics of discovery in qualitative analysis (Kleining & Witt, 2001; Timmermans & Tavory, 2012)

EXPLORING COMPLEXITY

- "What bonus or increment of knowing follows from **combining information from two or more sources**" (Bateson, 1979, p. 75) to produce a news of a difference, i.e. information" (Bateson, 1979, p. 76)

- **Method of Double Comparison** (Bateson, 1979): means to gain depth in vision and **seeing extra-dimensions,** new information, that, otherwise, we could not see (or foresight before)

- **How can Variation, Comparative practices and Method of Double (Multiple) Comparison be used by Complexity Science to promote its development and stimulate Abdution and Explanatory Inductions?**

COMPLEXITY: "IN-BETWEEN"

- "**Epistemology is an indivisible integrated meta-science**, whose subject matter is the world of evolution, thought, adaptation, embryology and genetics, the science of mind in the widest sense of the word. **The comparing of these phenomena (…) is the manner of search of the science called epistemology** (…) we may say that **epistemology is the bonus from combining insights** from all these separate genetic sciences"(Bateson, 1979, p. 97)

- "By the **manner of search** we can read what sort of discovery the searcher may thereby reach" (Bateson, 1979, p. 96)

EXPLORING COMPLEXITY: "IN-BETWEEN"

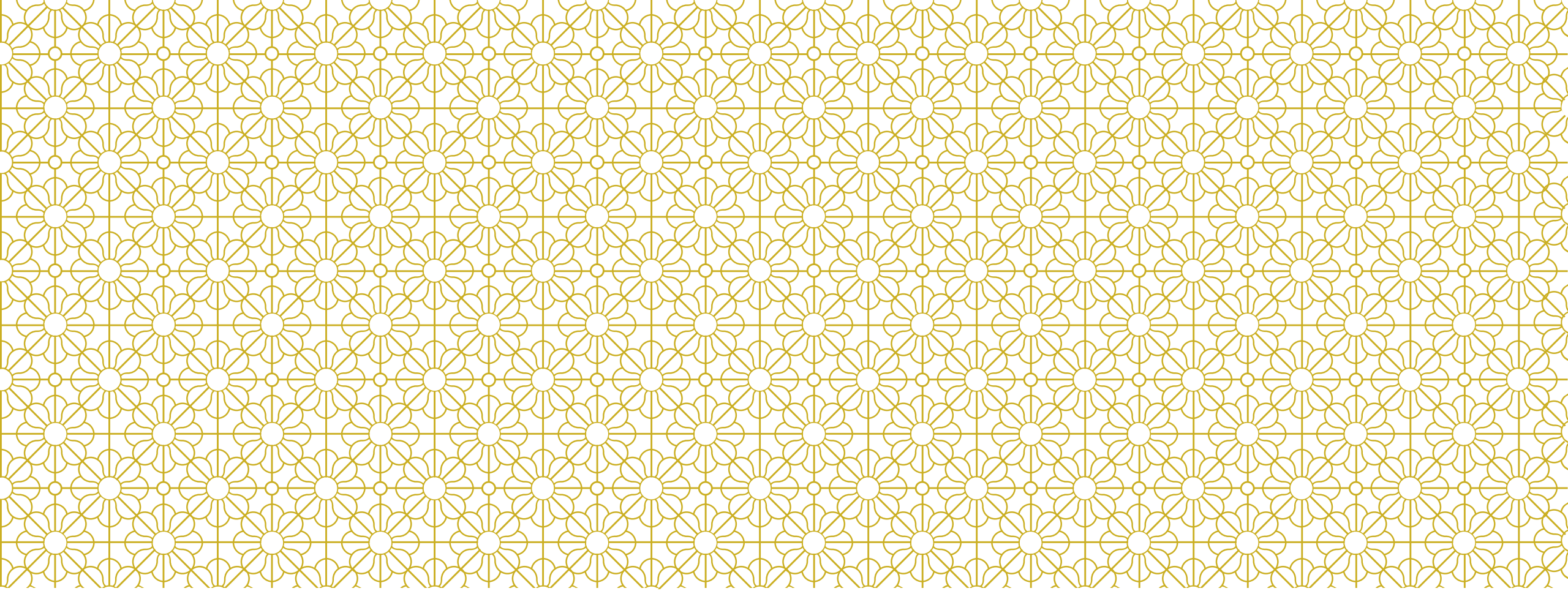
- It is the **difference** between two entities who are cooperatively, structurally coupled that **scaffolds** the exploration and expansion of their individual Zone of Proximal Development (Vygostsky), pushing each other to be creative by exploring their limits beyond habitual territories

- Complexity needs not just multiple methods but to **experiment with different forms of interpenetration of both concepts and method**s. It needs to explore multiple comparisons:
  - Between concepts and methods within a particular field
  - Between concepts and methods between different fields of study(Conceptual/Methodological)

COMPLEXITY: IN-BETWEEN

Interdisciplinarity as a source of **adaptive, creative perturbation:** differences as tools to put into question our "sacred" models and concepts , confront their limitations, be surprised, raise new questions and look for novel answers, and SEE what we could not see before

Exploratory interdisciplinary practices as part of a **creative and empowering core** for Complexity Science, favouring abductive and explanatory leaps while pushing its potential for development (as object and subject) further



CONTRIBUTIONS: HEURISTICS AND FORMS FOR ABDUCTING

Complex Complexity Science

INCUBATION PRACTICES

- Nurturing intradisciplinary and interdisciplinary **dialogical/dialectical scientific playgrounds** (vs strategic encounters) for the incubation of our collective potential for creative and abductive thinking:

  - Exploring each others' conceptual and methodological spaces
  - Defying each others to turning our questions upside down
  - Thinking "what if?"
  - Putting core concepts and assumptions into question or looking at them from different perspectives
  - Finding novel questions
  - Starting from pragmatically relevant hypothetical answers and pragmatically useful actions and looking for the questions and means that would fit
  - Nurturing stance of theoretical playfulness (Charmaz, 2006, Thornberg, 2012=
  - Having fun!
  - …

STRATEGIC ABDUCTION (BEYOND SURPRISE)

- In face of **limitations or constraints** of current knowledge
  - **Theoretical** (e.g. "blind spots"; inconsistencies; poor fit; unanswered questions; what is not explainable/comprehensible or conceivable despite indicators that call for explanation)
  - **Pragmatical** (e.g. insufficient efficacy of theory-informed practices; limitations for action aimed at improving human experience)

"The fact C is surprising OR insufficiently explained AND/OR provides insufficient guidance for useful effective practice/action.

If X were true,

The fact would be a matter of course OR/more clearly explained AND/OR offer more concrete guidance for useful and effective practice/action"

INTERDISPLINARY ABDUCTION

"A and B are similar but different.

If X were true,

Then both their differences and similarities would be a matter of fact,

Since they would share $X_{C\ (Complex\ principle)}$ while differ in X_{CA} and X_{CB}"

INTERDISPLINARY MULTIPLE COMPARISONS, ABDUCTION AND EXPLANATORY INDUCTION

"A well recognized phenomenon A shows the complex features/underlying processes C_1, C_2, C_3, $C_{i.}$

The phenomenon B shows these features/processes appearing in similar form C_1, C_2, C_3, $C_{i,}$ with the differences in the form of C'_1, C'_2, C'_3, $C'_{i,}$

B seems of the kind of A in regard to X,

And of a different kind of A in regard to Y.

But if W (process- pattern that connects) were true

The diferences and similarities would be a matter of course"

INTERDISPLINARY MULTIPLE COMPARISONS, ABDUCTION AND EXPLANATORY INDUCTIONS

"A and B are similar and different

$A_{concepts}$ (A_c) describe/explain A, and $A_{methods}$ (A_m) have been used

$B_{concepts}$ (B_c) describe/explain B, and $B_{methods}$ (B_c) have been used.

Given the differences between A and B,

For B_c AND/OR B_m to provide meaningful insights regarding A,

Would not be surprising if

$B_c \rightarrow A_c$ AND/OR $B_m \rightarrow A_m$,

OR $B_c \rightarrow A_m$ AND/OR $B_m \rightarrow A_c$,

On the account of X."

INTERDISPLINARY MULTIPLE COMPARISONS, ABDUCTION AND EXPLANATORY INDUCTIONS

"A and B are similar but different.

$A_{concepts}$ (A_c) describe/explain, and $A_{methods}$ (A_m) that are congruent with A_c, have been used.

$B_{concepts}$ (B_c) describe/explain and $B_{methods}$ (Bc) that are congruent with Bc, have been used.

Given the similarities and differences between A and B,

There is potential for novel information,

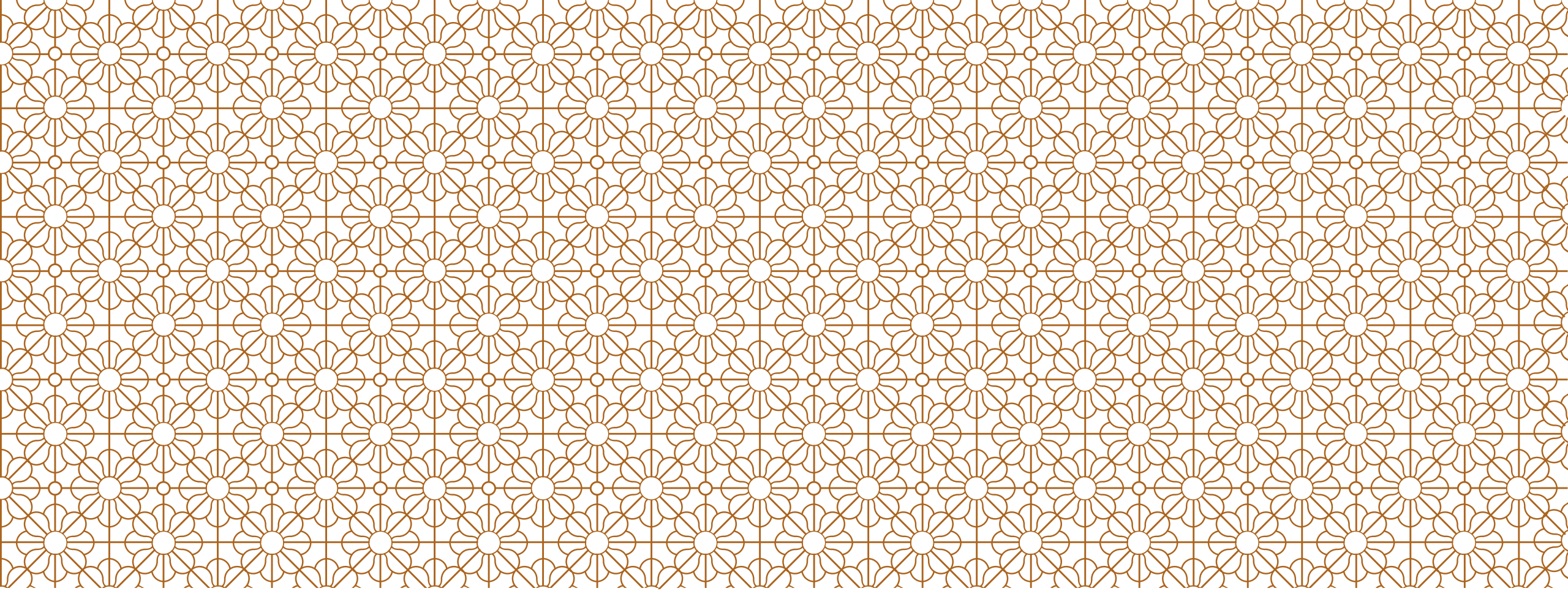
While minimizing "blind" conceptual importation and imposition,

When A_c X B_m to explore/clarify A, through its A_c,

AND/OR B_c X A_m, to explore/clarify B, through its B_c"

INTERDISPLINARY MULTIPLE COMPARISONS, ABDUCTION AND EXPLANATORY INDUCTIONS

Working together to Abduct new ways of Abducting?...



PARTICIPATING

Complexity

PARTICIPATING

"But epistemology is always and inevitably **personal**. The point of the probe is always at the heart of the explorer (...) I surrender to the belief that my **knowing is a small part of a wider integrated knowing** that knits the entire biosphere or creation" (Bateson, 1979, p. 98)

The subject-researcher as a complex entity and participant of the Complex World and Complexity Science

PARTICIPATING

Using the researcher's capacity to **connect and couple** with other human subjects and systems and to **systematically** use **the emergent experiential information** (sensations, feelings) as sources of information and new ideas

Recognizing the role of "instincts "when abducting (Nubiola, 2005), and "E**ducating" intuitions and inspiration** (Gubrium & Holstein, 2014) **with method and reflexivity** and a **complex thinking** that does not deny alternative forms of knowledge but **integrates them with standard scientific methods.**

"That the man's mind must have been attuned to the truth of things in order to discover what he has discovered. It is the very bedrock of logical truth"

(CP, 6.476, 1908; Nubiola, 2005)

PARTICIPATING

Relating to methods as a **part and extention of one's own thoughts** and (complex) reasoning

Dialogical/dialetical relationship between thinking and method:

Inspiration to methods, from reasoning, and to forms of reasoning from methods

"La méthode c'est l'activité pensant du sujet" (..) "c'est la part inéluctable d'art et de stratégie dans toute paradigmatologie, toute théorie de l'a complexité"

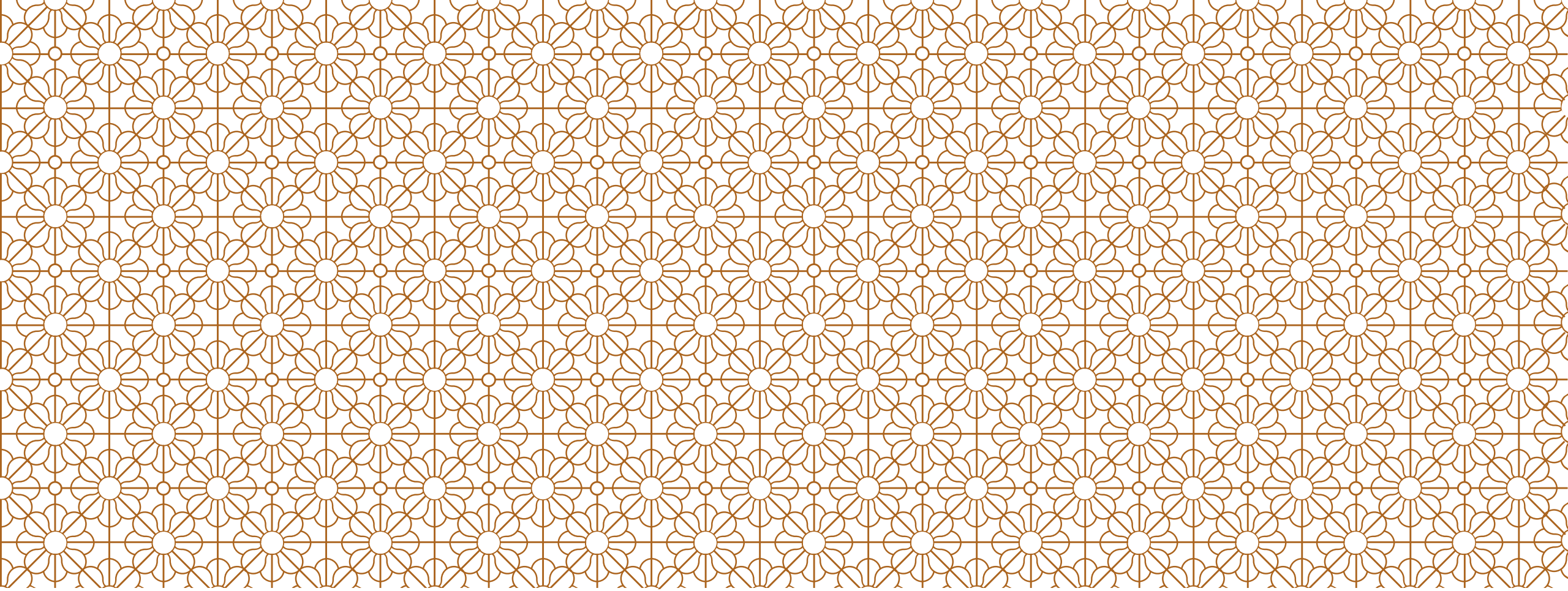
(Morin, 1990, p. 313)

PARTICIPATING

Complexity science must Grounded and Connected to Real Life and the Experiences of those who participate in it. The researcher needs to connect and participate in this reality with other scientists but also with other participants in the Complex World

Complexity Science must Resonate with its Complex Objects and Subjects

"Does it "feel" Complex?"



CONSTRUCTING

Complexity

CO-CONSTRUCTING

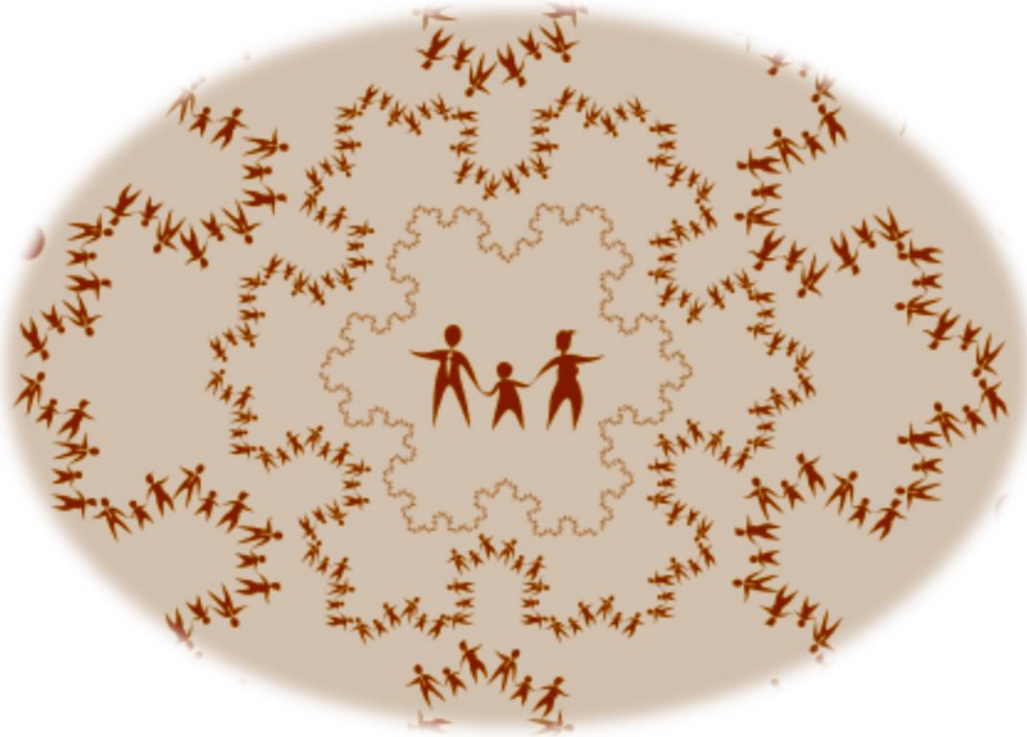
Complexity Science should develop on the account of intra and interdisciplinary creative and dialogical networks of researchers embedded and connected to real life

The individual researcher as a co-constructer should assume the **responsibility** of connecting his/her findings, hypotheses and methods with those of others and to work for the construction of progressively more complex (integrative) forms of organisation of knowledge

The individual researcher should assume the responsibility for framing this/her specific questions and findings and the narrower researcher focus into a **larger theoretical and methodological landscape,** aiming at more fundamental questions

CO-CONSTRUCTING

Exploring, Participating and Constructing a Complex Complexity Science could be about embracing the challenge of cooperatively co-constructing an **aesthetically sensitive Complexity Science**, (aesthetics being the "responsiveness to the pattern which connects", Bateson, 1979, p. 9)), which is both subject and object of itself, One and Many, which distinguishes and integrates, which is formed and informed by scientists which are also more than just that, and often curious and creative, because of that complex something else they also are.



Thank you very much for your attention!

To continue dialogue: anamelopsi@gmail.com

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