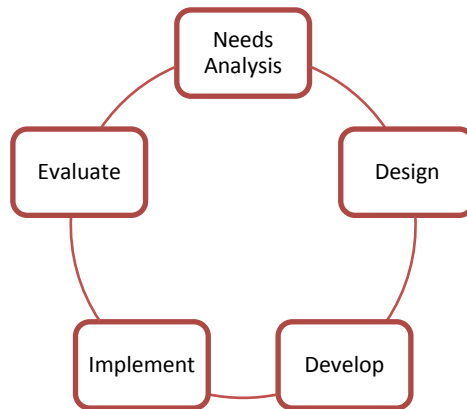


## Statement of Objectives

It is about Learning-Design: by human-being, and by artifacts

**Learning-Design** refers to the systematic process of analyzing learning needs and providing learning solutions.



I strive to help people discover more effective, efficient, and engaging ways of doing Learning-Design.

### Learning-Design by human-being

LD (Learning-Design) skills are needed by learners, teachers, learning designers, software designers, and many other roles.

I believe that LD should be treated as a basic literacy mastered by everyone; it should be systematically learned, starting from pre-schools and lasting lifelong.

Meanwhile, the advance of learning sciences relies on each person who understands, applies, evaluates, and develops theories.

### Learning-Design by artifacts

Learning-Design is a key dimension for cognitive tools; it is important that cognitive tools integrate LD functions explicitly and systematically.

Any artifact addressing the needs of learning-&-performance should embed and support LD functions; to name a few: intelligent digital tools, toys, job aids, museum objects, and books.

Many current tools are weak in terms of LD functions.

There are BIG GAPS, and therefore GREAT POTENTIAL for developing LD-tools and integrating LD functions into existing tools.

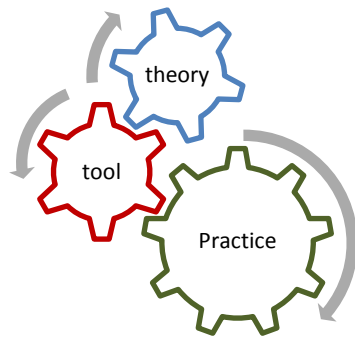
## My Immediate Goals

1. Design & develop a knowledge-building environment for collectively developing Learning-Design innovations: theories, tools, & practice.

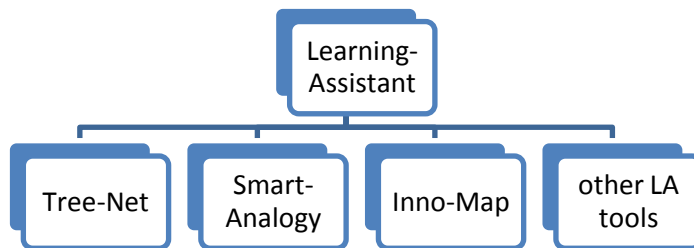
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An environment for collectively developing LD innovations: theory, tool, & practice.

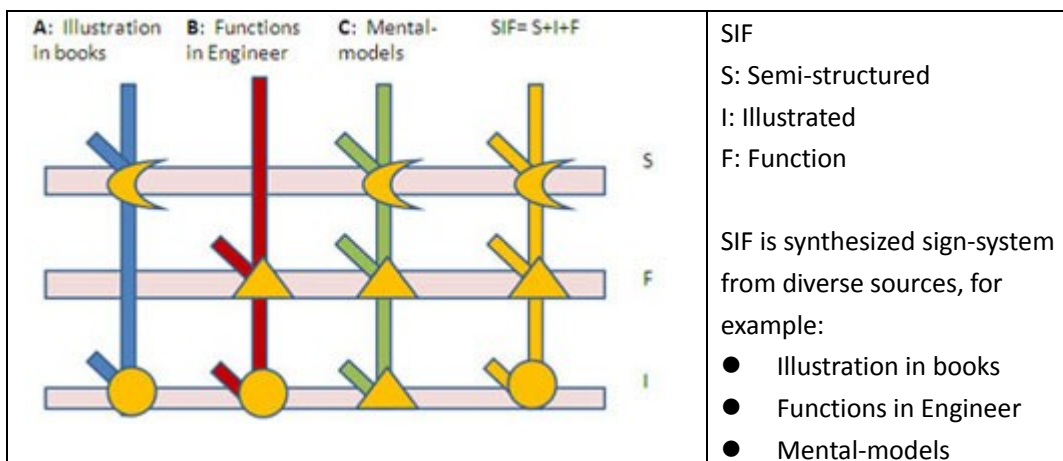
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2. Design & develop a few tools: Tree-Net, Smart-Analysis, & Inno-Map. These tools can be categorized as Learning-Assistant, which is a type of tools for supporting Learning-Design.



3. Explore how to help existing & emerging tools (TED, Quora, Wikipedia, Microsoft Office, Adobe Suite, Articulate, & Inspiration etc.) to embed and support LD functions.
4. Explore how SIF (Semi-structured illustrated function, a sign-system synthesized by me) can facilitate the development of social sciences; and how AI of social science may become more feasible.



5. Explore the potential for developing an independent science: INNOVATION science. And explore how patterns of innovation can be integrated into other sciences and arts.

All these goals are closely related and intersected.

I am going to discuss a structure called Tree-Net. Tree-Net is a powerful tool for helping me achieve my goals.

Meanwhile, Tree-Net connects and presents my works in an incredibly neat and beautiful way.

## Tree-Net

### What is Tree-Net?

Tree-Net is a dynamic, flexible, and synthesized structure incorporating patterns of our action, perception, and conception in three 'places': in cognitive space, in physical space, and in digital space.

I am trying to design and develop a tool with the same name--Tree-Net Tool-- for helping people understand and apply the structure of Tree-Net, and then co-build this structure.

### Why Tree-Net?

Wilson (1998) states "We are approaching a new age of synthesis, when the testing of consilience is the greatest of all intellectual challenges"(pp.11-12).

I have been tackling this challenge for a few years, and Tree-Net is the result of my efforts. Tree-Net can be a powerful tool for everyone's discovering solutions for the great challenge of consilience.

Tree-Net can be used by everyone who is building knowledge, with supporting the processes of note-taking, brainstorming, analyzing, visualizing, synthesizing, evaluating, collaborating, and other problem solving processes.

I am inspired by TED talks, a few of them are:

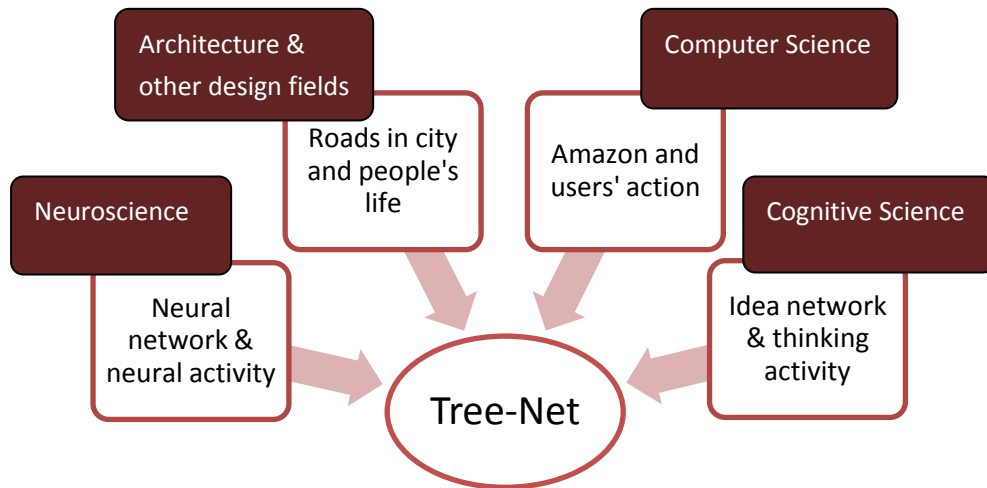
1. I am my connectome By Sebastian Seung	I get the visualization and imagination on possible neural activity patterns.
2. Taking imagination seriously, By Janet Echelman	Janet builds Net-Sculpture, Why cannot I build Net-Tree structure?
3. The beauty of data-visualization, By David McCandless	It is about visualization: visualizing data, visualizing abstract concepts, visualizing action-scripts
4. Metaphorically speaking By James Geary	Metaphors & analogies are powerful for learning, innovating, visualizing, & communication.

Inspired by these talks and other sources, I develop my ideas of Tree-Net.

**Sources of Tree-Net**

I am developing Tree-Net with borrowing, tailoring, & synthesizing structures from four sources:

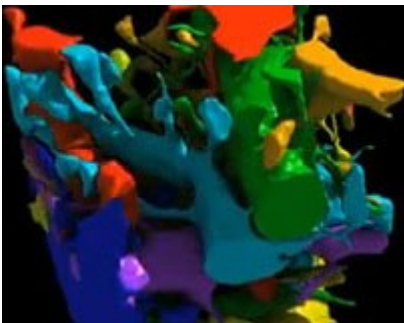
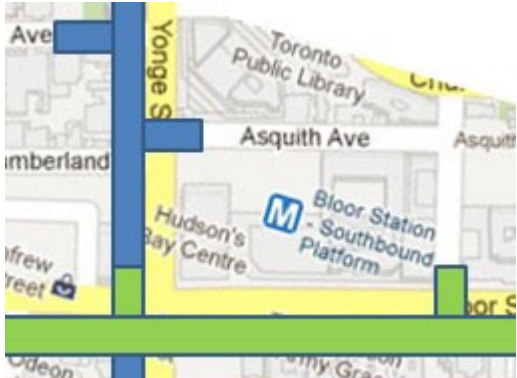
1. Neural network and neural activity (More broadly: neuroscience)
2. A city and people's life in the city (More broadly: architecture, civil design etc. )
3. Amazon's structure and user behavior (More broadly: computer science)
4. Idea tree-net and thinking-activities with ideas (More broadly: cognitive science)



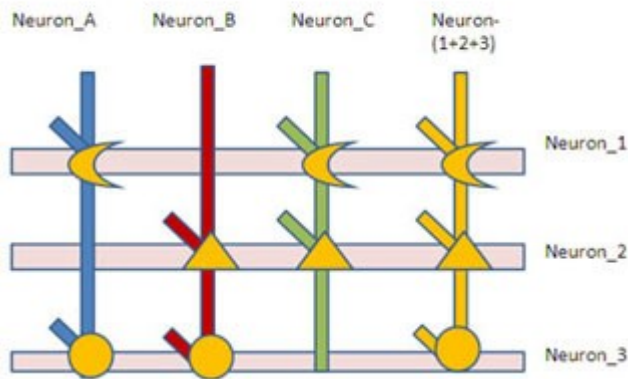
**Features of Tree-Net**

As the Tree-Net structure is currently under-development, I only introduce a few fundamental features here:

1. The net is woven with threads, with each thread like a tree.

<p>In our brain, each neuron is like a tree, weaving with many other neuron-trees</p>	<p>In a city, each road is like a tree, weaving with many other road-trees.</p>
 <p>Image is from TED talk: I am my connectome, by Sebastian Seung</p>	

### Neuron Tree Net



In the website of Amazon, each book page is like a tree, weaving with many other book-trees.  
 In the following graphic, Book-1 is woven with Book-2 and Book-3, through feature A, B, & C.

	Book 1	Book 2	Book 3
A: Users all buy this book			
B: These books are for children			

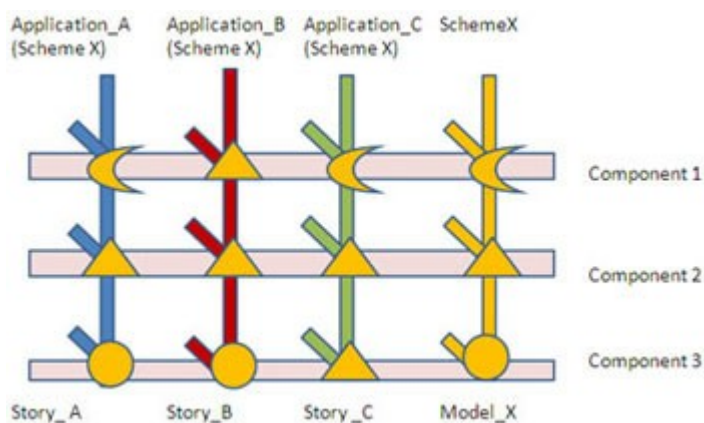
In an Amazon website page, a book-record is in a vertical way.

In a database table, a record is like a tree, weaving with many other records through related fields. Each field is like a tree too, weaving with many other field-tree with related records

	Field A	Field B
Record 1 Book 1		
Record 2 Book 2		
Record 3 Book 3		

In a table, we might be more used to take a record horizontally.

In an idea-tree-net, an idea is a tree, weaving with many other idea-tree-nets



- An idea might be a theory (Model)
- An idea might be a story (application of the Model)
- A model consists of 3 components

3 stories and 1 model are like record-tree in a table

3 components are like field-tree

2. The tree-net is the route-network for an object/organism's action.
  - In our brain, neural network is the route-network for neural activity, with the 'object' as chemical/electric signals.
  - In a city, roads are route-network for a person, with the 'organism' as a person
  - In Amazon, pages-&-hyperlinks are route-network for users' surfing activity, with the 'organism' as a person who sees and clicks.
  - In a database table network, horizontally or vertically, one person can go from one cell to any other cells
  - In an idea-tree network, one person can visit from one idea to any other ideas.
3. New trees can be added into the network
4. Each tree-thread can grow, form new connections with other tree-threads.
5. Some tree-threads/connections might disappear, become weaker, or become part of new threads/connections.
6. The route-networks build the foundations for the objects/organisms' activities; however, overtime, the objects/organisms might change the route networks.
7. Meaningful activities drive object/organisms' movements inside the route networks.
8. Objects/organisms criss-cross the route networks. At a given time, space & culture, for a specific goal, an object/organism navigate the route networks in a special way.
9. There are multiple-levels of navigation systems for objects/organisms' moving.
10. Overtime, objects/organisms change the route-networks.

### **A thinker's ideas flow in idea-tree networks**

A thinker's ideas move inside idea-tree networks, which can be understood as a continuous spectrum of thinking activity.

Or in the terminology of educational semiotics: learning is the continuously dynamic process of creating and interpreting signs.

For a thinker's 'IDEAS' as moving objects/organisms, I adopt a fantasy projecting: to be in the shoes of an IDEA, an IDEA has the personalities of a human-being.

For visualizing how foods move and change inside a body, we might 'turn ourselves into' a food, and do a fantasy journey: to see what happens in the eyes/shoes of foods.
---

In a TED talk 'Animates a cell', a cell 'becomes' a city, molecular 'becomes' machine working inside the cell-city. We visualize what happens inside the cell-city, like in the eyes of a molecular.
--

So, in order to understand how ideas form/flow/change, an interesting way might be projecting 'IDEAS' to 'ORGANISMS', which are visible, touchable, & capable of thinking and talking like a human.

In this way, we might visualize how ideas form, flow, & transform, within the framework of a thinker or a group of thinkers.

A thinker is a human-being or an artifact with some-degree-human-like intelligence. We are interested in seeing what happens when the framework of 'thinkers' take the diverse combinations of human-beings and artifacts.

I think that this is a key issue in HCI and AI.

I try my best to integrate learning theories into this fantasy projecting, so that users can visualize some patterns of learning.

### **Tree-Net plays an important role in designing cognitive tools**

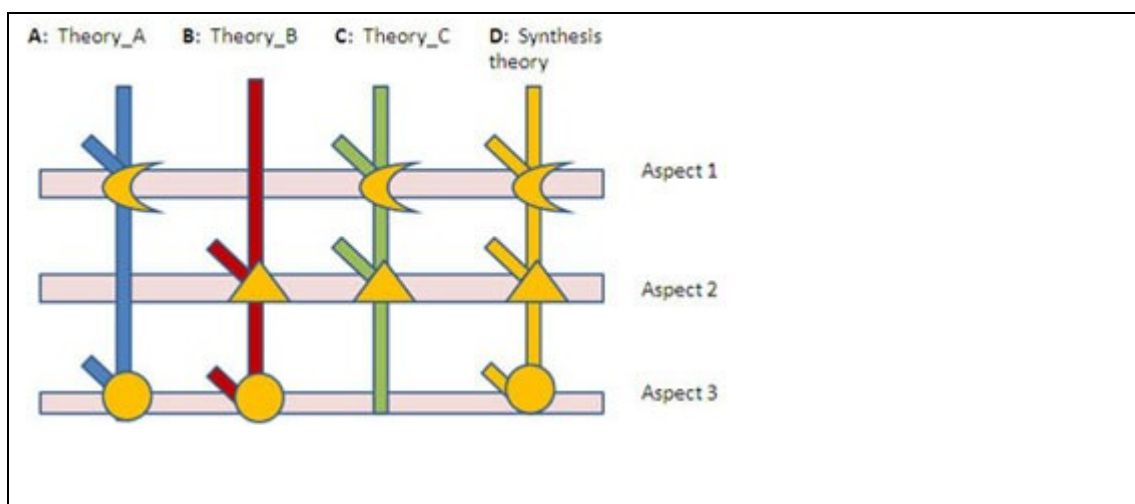
Tree-Net structure addresses how we think, learn, and solve problems from a multiple--discipline lens; it can help us build cognitive-relevant tool functions.

To name a few, tools about: note-taking, brainstorming, abstracting and synthesizing patterns from analogical sources, group collaborating, synthesizing ideas etc.

### **A few application cases**

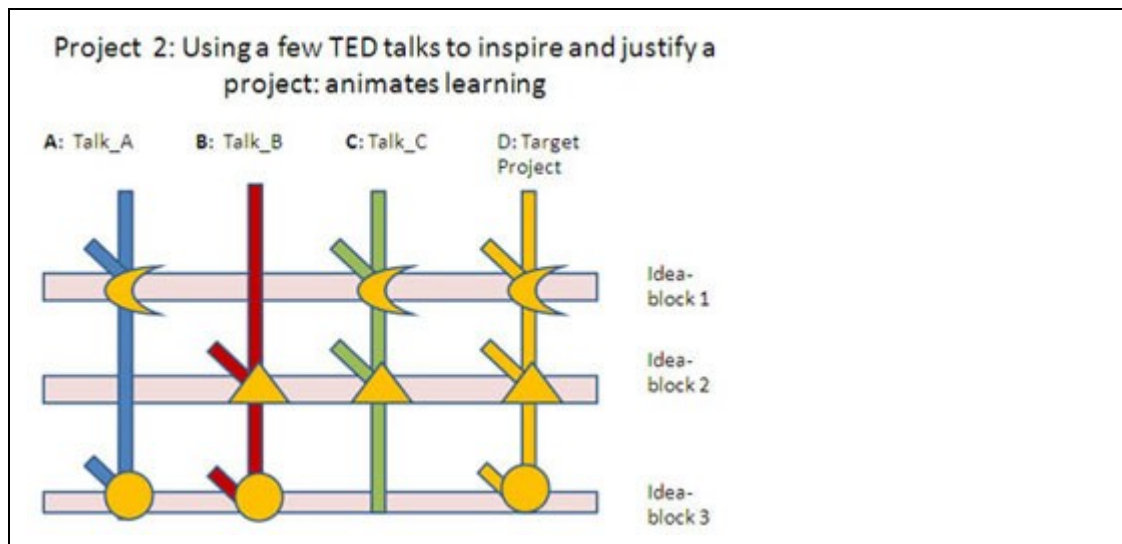
**Case 1:** How to develop, evaluate, & synthesize learning theories: by individuals, by a close group, & by a large community?

**Wider application:** any process of theory developing, evaluating, and synthesizing.



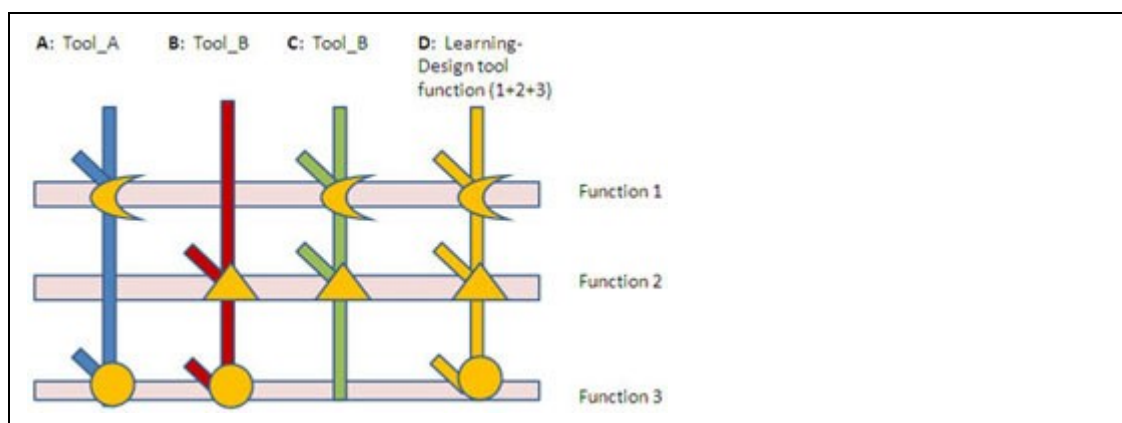
**Case 2:** How can TED talks inspire and justify the project on 'animating a cell?'

**Wider application:** any process of documenting and learning from online knowledge communities; new ways of using and playing with tags; new ways of tracing and synthesizing micro-piece of thinking-&-writing in micro-blogging etc.



**Case 3:** How to get analogical ideas for Learning-Design tools: by individuals, by a close group, & by a large community? The analogical sources are from other design fields and tools.

**Wider application:** any knowledge building process with using analogies



**Case 4:** How to build Tree-Net: by individual, by a close group, & by whole community?

Please refer to my portfolio for illustrations on these cases.



### **Why MIT Media Lab?**

My target projects carry the nature of HCI, AI, design, software, & education. I feel that this is a perfect match with what MIT Media Lab aim to do.

I believe that I can get great mentoring and supporting from professors and peers.

My project is about multi-discipline, synthesizing-disciplines; the Media Lab is an amazing place for this type of projects.

I love the innovative culture in the Media Lab.

### **How does my background support my goal?**

With a multiple-discipline background (educational technology, mathematics, computer sciences, and accounting), I can vision problems in diverse lens, and solve problems with multiple expertise.

More importantly, I have strong passion for my goals (design tools for Learning-Design), and have devoted to them intensively for over 4 years.

I self-evaluate that I have made some innovative breakthroughs for learning sciences, and I love to get feedbacks from diverse sources.

As a creative learning designer, I can bring sound and sharp insights of learning into designing intelligent tools, for my own projects and for other projects in the Media Lab.

My mathematical-and-programming background ensures that I am capable of learning skills fast -- whatever skills that are necessary for my goal.

I love to learn more computer science knowledge and skills because I aim to get analogies from computer sciences in a more systematic way. I believe that the development of computer sciences can inform the development of learning sciences greatly.

Thank you very much for your time!

### **Reference**

Wilson, E. O. (1998). Consilience: The unity of knowledge. NY: Knopf.

My Portfolio: <http://www.beyondinno.com/myportfolio>