These simulation projects for the Computational Cognitive Neuroscience textbook, implemented in Emergent provide a crucial interactive learning experience to complement the text. There are links to these simulation projects in the relevant sections of the text. This page collects all of the simulations.

**General Usage Tips**

In addition to all the tips available at the Emergent website, the following are particularly relevant to these projects:

- The project files can now be downloaded via the Published Project info box at top right of docs (and opened directly when accessed from within emergent) -- some projects require additional files to be downloaded -- see note at top of docs about this.
- If your screen is small, you may also want to make the document window "Always on Top": (e.g., in Linux, `Emergent-logo-at-top-left/Advanced-> Keep Above Others`) and also use the "Shade" feature: double-click the top control bar to toggle the window between "rolled up" and "rolled down" (also: `Emergent-logo->Shade`). (Caution: you cannot double click on the Emergent-logo itself!). Keeping the ProjectDocs window on the left over the tree browser panel frame seems to work best since you will generally be watching and working with the right two frames the most.
- **Important:** Projects require version 8.0.4 or later of emergent, (8.0.4 released Jan 12, 2017). Please see the ChangeLog doc in each project for summary of changes (especially if you've taught these before -- good to know what is new!)

### One .zip File of All Projects

Download all the simulations in a single .zip file -- for different versions of emergent (important to use the proper version -- current live versions of files on wiki are for latest released version)

- `cecn_8_5_2.zip` -- for emergent version 8.5.1+ (current as of now) -- still compatible with 8.5.1 but some updated projs
- `cecn_8_5_1.zip` -- for emergent version 8.5.1+
- `cecn_8_0_4.zip` -- for emergent version 8.0.4 - 8.2.0.
- `cecn_8_0_3.zip` -- for emergent version 8.0.0 - 8.0.3.
- -- for emergent versions 7.0.1 and earlier (takes you to a list of files -- most recent is 7.0.1)

### Chapter 2: Individual Neurons

- Neuron (neuron.proj) -- Individual Neuron -- spiking and rate code activation. ([Questions 2.1 - 2.7](#))
- Detector (detector.proj) -- The neuron as a detector -- demonstrates the critical function of synaptic weights in determining what a neuron detects. ([Questions 2.8 - 2.10](#))

### Chapter 3: Networks of Neurons

- Face Categorization (face_categ.proj) -- face categorization, including bottom-up and top-down processing (used for multiple explorations in Networks chapter) ([Questions 3.1 - 3.3](#))
- Cats and Dogs (cats_and_dogs.proj) -- Constraint satisfaction in the Cats and Dogs model. ([Question 3.4](#))
- Necker Cube (necker_cube.proj) -- Constraint satisfaction and the role of noise and accommodation in the Necker Cube model. ([Question 3.5](#))
• Inhibition (inhib.proj) -- Inhibitory interactions. (Questions 3.6 - 3.8)

**Chapter 4: Learning**

• Self Organizing (self_org.proj) -- Self organizing learning using BCM-like dynamic of XCAL (Questions 4.1-4.2).
• Pattern Associator (pat_assoc.proj) -- Basic two-layer network learning simple input/output mapping tasks with Hebbian and Error-driven mechanisms (Questions 4.3-4.6).
• Error Driven Hidden (err_driven_hidden.proj) -- Full error-driven learning with a hidden layer, can solve any input output mapping (Question 4.7).
• Family Trees (family_trees.proj) -- Learning in a deep (multi-hidden-layer) network, showing advantages of combination of self-organizing and error-driven learning (Questions 4.8-4.9).

**Chapter 6: Perception and Attention**

• V1RF (v1rf.proj) -- V1 receptive fields from Hebbian learning. (Questions 6.1-6.2)
• Objrec (objrec.proj) -- invariant object recognition. (Questions 6.3-6.5)
• AttnSimple (attn_simpleproj) -- simple attention model. (Questions 6.6-6.11)

**Chapter 7: Motor Control and Reinforcement Learning**

• BG (bg.proj) -- Action selection / gating and reinforcement learning in the basal ganglia. (Questions 7.1 -- 7.4)
• RL (rl_cond.proj) -- Pavlovian Conditioning using Temporal Differences Reinforcement Learning. (Questions 7.5 -- 7.6)
• PVLV (PVLV.proj) -- Pavlovian Conditioning with the PVLV model (Questions 7.7 -- 7.9)
• Cereb (cerebproj) -- Cerebellum role in motor learning, learning from errors. (Questions 7.10 -- 7.11)

**Chapter 8: Learning and Memory**

• ABAC (ab_ac_interference.proj) -- Paired associate learning and catastrophic interference. (Questions 8.1 -- 8.3)
• Hippocampus (hip.proj) -- Hippocampus model and overcoming interference. (Questions 8.4 -- 8.6)
• WtPriming (wt_priming.proj) -- Weight-based (long-term) priming. (Question 8.7)
• ActPriming (act_priming.proj) -- Activation-based (short-term) priming. (Question 8.8)

**Chapter 9: Language**

• Dyslexia (dyslex.proj) -- Normal and disordered reading and the distributed lexicon. (Questions 9.1 -- 9.6)
• Spelling to Sound (ss.proj) -- Orthography to Phonology mapping and regularity, frequency effects. (Questions 9.7 -- 9.8)
• Semantics (sem.proj) -- Semantic Representations from World Co-occurrences and Hebbian Learning. (Questions 9.9 -- 9.11)
• Sentence Gestalt (sg.proj) -- The Sentence Gestalt model. (Question 9.12)
Chapter 10: Executive Function

• Stroop (stroop.proj) -- The Stroop effect and PFC top-down biasing (Questions 10.1 - 10.3)
• A Not B (a_not_b.proj) -- Development of PFC active maintenance and the A-not-B task (Questions 10.4 - 10.6)
• SIR (sir.proj) -- Store/Ignore/Recall Task - Updating and Maintenance in more complex PFC model (Questions 10.7 - 10.8)

Student Projects

• CCNBook/Student Projects -- Projects developed by students in various classes.

Style Guide for Writing Docs

• Style Guide -- contains all the formatting templates to use in writing project docs for simulations. Please use these to maintain consistency and clarity in docs.

Published Project Listing of Sims

• CCNBook/Sims/QueryList -- uses the semantic mediawiki query to list all the projects, with tags and flexible sorting order -- can help you see what they're all about, and the update status, etc in one glance.
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