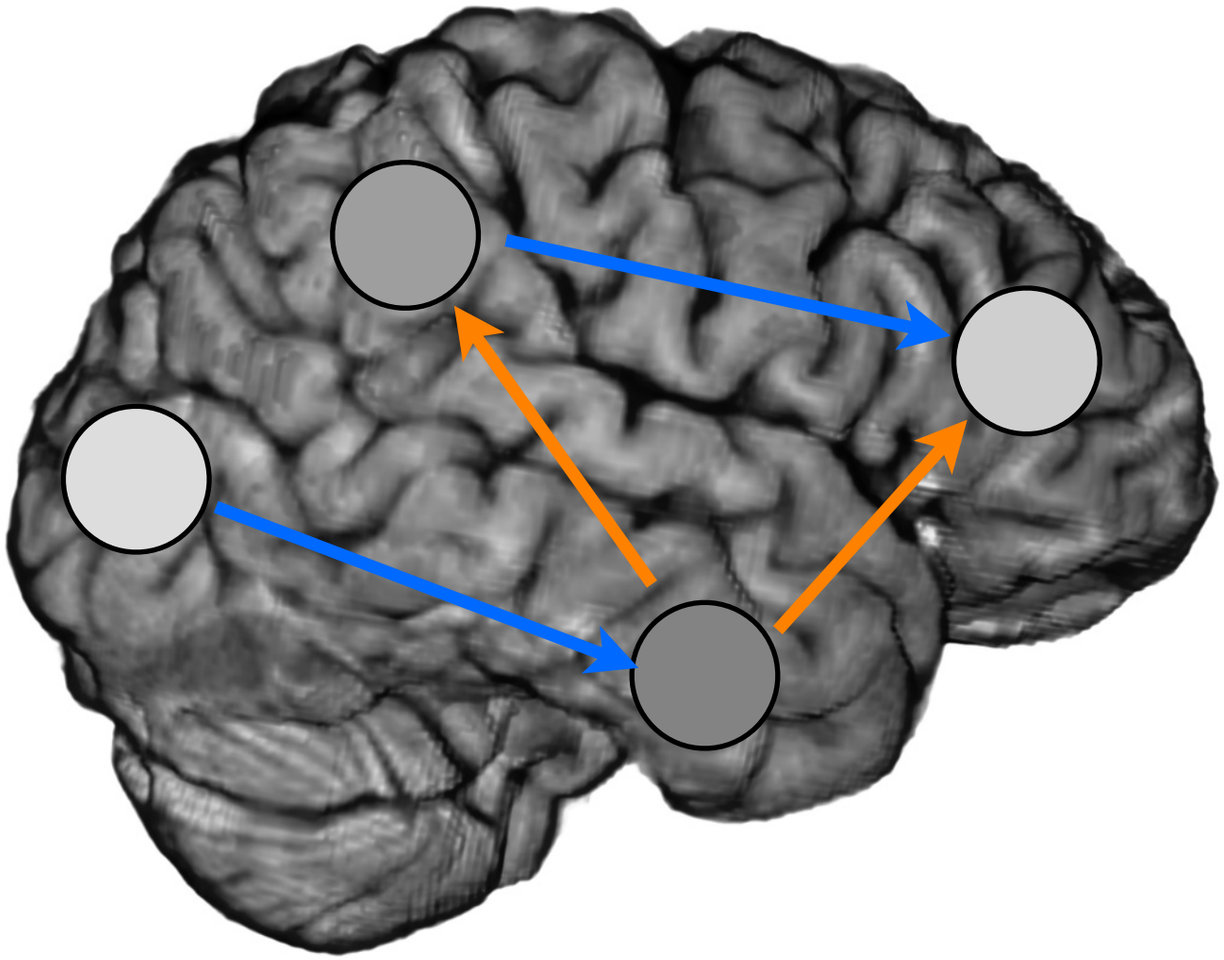
The Daley lab



Department of Computer Science
Department of Biology
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Western University

Western

Brain and Mind
The University *of* Western Ontario

$$\rho\left(\frac{\partial \mathbf{v}}{\partial t} + \mathbf{v}\cdot\nabla\mathbf{v}\right) = -\nabla p + \nabla\cdot\mathbf{T} + \mathbf{f},$$

n=7 , δ=20°
X
X $\rightarrow$F[+X]F[-X]+X
F $\rightarrow$FF

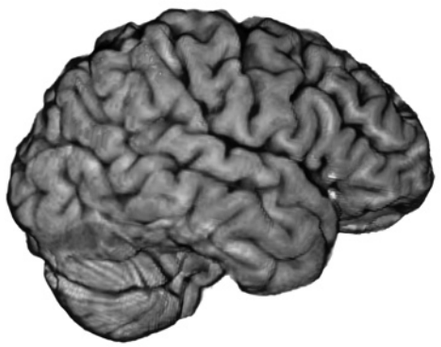
$$\tau_k \frac{\partial}{\partial t} h_k(\vec{x},t) = h_k^r - h_k(\vec{x},t) + \Sigma_{l=e,i} \Psi_{lk}\left[h_k(\vec{x},t)\right] \cdot I_{lk}(\vec{x},t)$$

or

“What do I want for lunch?”

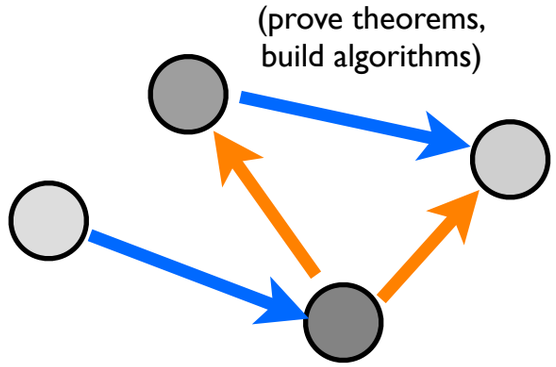
What we do

Study nature



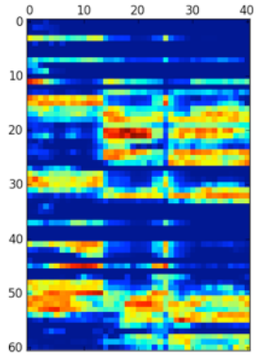
Build mathematical models

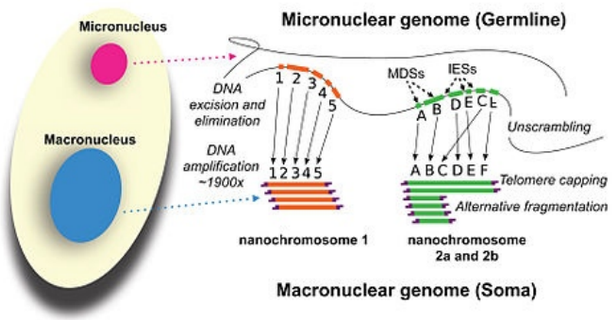
(prove theorems, build algorithms)

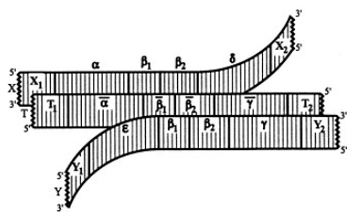


Observe nature, according to model

(Implement algorithms, gather data)





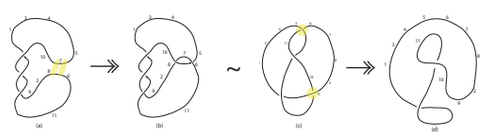


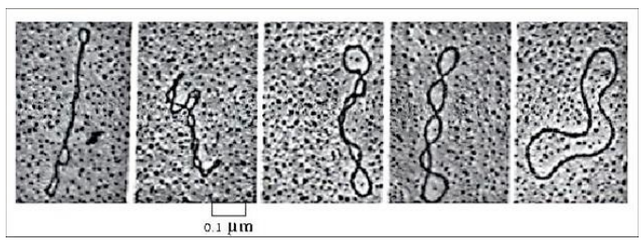
$$\frac{u\alpha\beta d.\quad \alpha\beta\gamma\quad e\beta\gamma v}{u\alpha\beta\gamma v}$$

$$\pitchfork(\mathcal{L}_1, \mathcal{L}_2, n_1, n_2) = \{\varrho(L) \mid L \in \mathcal{L}_1, \varrho = (T, \Sigma, n_1, n_2), T \in \mathcal{L}_2\}$$

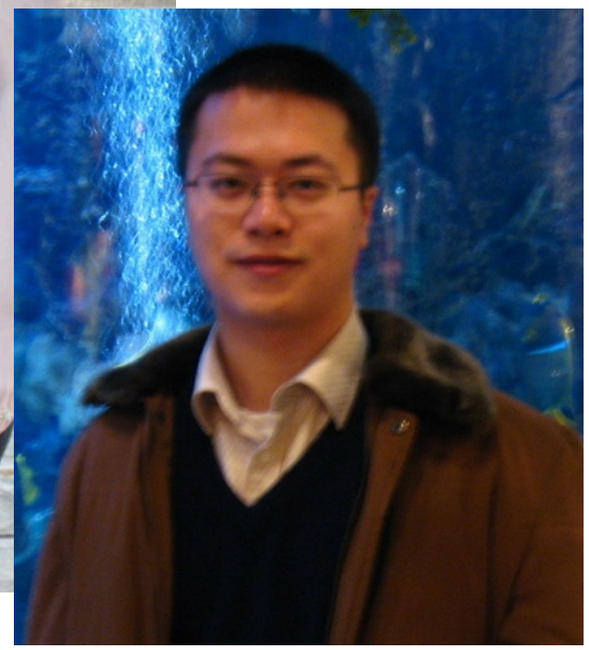
$$\pitchfork(\mathcal{L}_1, \mathcal{L}_2) = \{\pitchfork(\mathcal{L}_1, \mathcal{L}_2, n_1, n_2) \mid n_1, n_2 \in \mathbb{N}\}$$

Theorem 4.1 *Let $\mathcal{L}$ be a full AFL, $\varrho = (T, \Sigma, n_1, n_2)$ a TGR system and let $L, T \in \mathcal{L}, L \subseteq \Sigma^*$, and assume that ϱ is useful on L. Then $\varrho^*(L) \in \mathcal{L}$.*





Resources



Natural computing
Computability theory
Complexity theory
Information theory
Combinatorics
(low-d) Topology
Applied statistics

Functional programming
High-performance computing
GPU & FPGA
(basic) molecular biology
~~Electron microscopy~~
fMRI
EEG & MEG

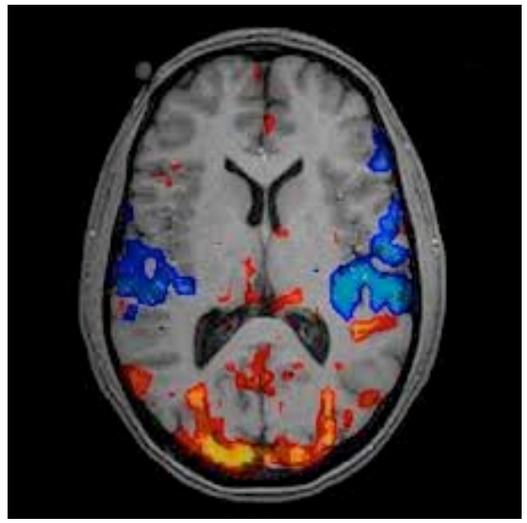
Some funded Applications

Neonatal Neurological Assessment

(with R. Cusack)

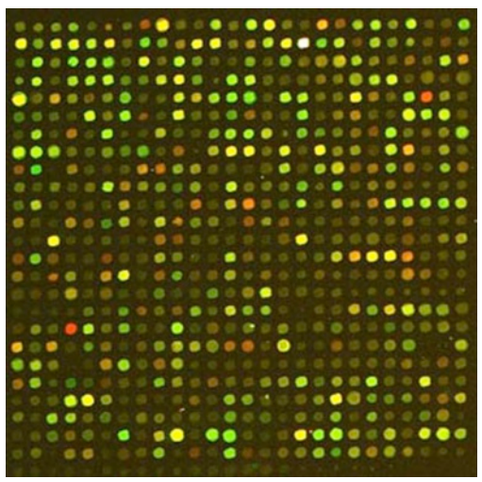
CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

NSERC CRSNG



IBM

Real-time fMRI graphs with FPGAs



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Fractionating phenotype from genotype, fMRI and behavioural data.
(with B. Morton)