

PRACTICAL SUMMER COURSE: MODELING FOR SYSTEMS BIOLOGY

PROGRAM

Barcelona, CRG, July 1-6, 2012

Sunday – Day 1: “Basic Mathematical Concepts & Introduction to MatLab” (Optional)

Hosts: James Sharpe & Johannes Jäger

Teachers: Kai Dierkes, Andreea Munteanu & Marie Jeanne Trussart

When	What	Topic	Where
11:00am – 01:00pm	LECTURE	Linear Algebra	Marie Curie
	Lunch		Inner square
02:00pm – 04:00pm	LECTURE	Ordinary Differential Equations	Marie Curie
	Break		Inner square
04:30pm – 6:30pm	LECTURE & PRACTICAL	Introduction to Matlab	Marie Curie

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Monday – Day 2: *“Dynamical systems theory, networks”*

Host: Johannes Jäger

Teacher: Mukund Thattai

Assistants: Andreea Munteanu & Jennifer Semple

When	What	Topic	Where
09:00am – 09:30am	WELCOME		Marie Curie
09:30am – 10:15am	LECTURE 1	The physical basis of gene regulation	Marie Curie
	Break		Inner square
10:30am – 11:30am	LECTURE 2	Genetic networks	Marie Curie
11:30am – 12:30pm	PRACTICAL	Dynamical systems and bifurcation analysis I	Marie Curie
01:00pm – 02:00pm	Lunch		PRBB Canteen
02:00pm – 03:30pm	PRACTICAL	Dynamical systems and bifurcation analysis II	Marie Curie
	Break		Inner square
04:00pm – 05:00pm	LECTURE 3	Promoter logic functions, network motifs	Marie Curie
05:00pm – 05:30pm	DISCUSSION		Marie Curie
06:00pm	PUBLIC LECTURE	“Gene networks in theory and practice	Ramón y Cajal
08:30pm	DINNER		Sotavento Restaurant

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Tuesday – Day 3: “Stochastic systems”

Host: James Sharpe

Teacher: Jörg Stelling

Assistant: Marco Musy

When	What	Topic	Where
09:00am – 10:00am	LECTURE 4	Introduction to stochastic systems	Marie Curie
	Break		Inner square
10:15am – 11:15am	LECTURE 5	Stochastic simulation	Marie Curie
	Break		
11:30pm – 12:30pm	PRACTICAL	Stochastic simulation	Marie Curie
01:00pm – 02:00pm	Lunch		PRBB Canteen
02:00pm – 03:00pm	LECTURE 6	Analysis of noise and variability	Marie Curie
	Break		Inner square
03:30pm – 05:00pm	PRACTICAL	Analysis of noise and variability	Marie Curie
05:00pm – 05:30pm	DISCUSSION		Marie Curie
	Break		
06:00pm	PUBLIC LECTURE	“Biological systems analysis under uncertainty”	Ramón y Cajal

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Wednesday – Day 4: *“Multivariate and multidimensional data analysis”*

Host: Matthieu Louis

Teacher: Fernando Amat

Assistants: Anton Crombach & Kai Dierkes

When	What	Topic	Where
09:00am – 10:00am	LECTURE 7	Multivariate analysis and dimensionality reduction techniques	Marie Curie
	Break		Inner square
10:15am – 11:15am	PRACTICAL		Marie Curie
	Break		
11:30pm – 12:30pm	LECTURE 8	Unsupervised pattern recognition methods	Marie Curie
01:00pm – 02:00pm	Lunch		PRBB Canteen
02:00pm – 02:45pm	PRACTICAL		Marie Curie
	Break		Inner square
03:00pm – 04:00pm	LECTURE 9	Supervised pattern recognition methods	Marie Curie
04:15pm – 5:15pm	PRACTICAL		Marie Curie
05:15pm – 05:30pm	DISCUSSION		Marie Curie
	Break		
06:00pm	PUBLIC LECTURE	“Probabilistic methods to solve large-scale bioimaging problems”	Charles Darwin

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Thursday – Day 5: “Parameter inference, reverse engineering”

Host: Johannes Jäger

Teacher: Theodore Perkins

Assistants: Lucia Marucci & Marie Jeanne Trussart

When	What	Topic	Where
09:00am – 10:00am	LECTURE 10	Inference of static network models	Marie Curie
	Break		Inner square
10:15am – 11:15am	PRACTICAL	Inference of dynamic network models	Marie Curie
	Break		
11:30pm – 12:30pm	LECTURE 11	Inference of stochastic network models	Marie Curie
01:00pm – 02:00pm	Lunch		PRBB Canteen
02:00pm – 03:30pm	PRACTICAL		Marie Curie
	Break		Inner square
04:00pm – 05:00pm	LECTURE 12	Inference of stochastic network models	Marie Curie
05:00pm – 05:30pm	DISCUSSION		Marie Curie
	Break		
06:00pm	PUBLIC LECTURE	“Powerlaw and non-powerlaw scaling in stochastic symbol systems (including molecular dynamics)”	Charles Darwin

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Friday – Day 6: *“Biophysical and cellular models”*

Host: James Sharpe

Teacher: Javier Buceta

Assistants: Kai Dierkes & Marco Musy

When	What	Topic	Where
09:00am – 10:00am	LECTURE 13	Cellular & biophysical models I	Marie Curie
	Break		Inner square
10:15am – 11:15am	PRACTICAL	Cellular & biophysical models II	Marie Curie
	Break		
11:30pm – 12:30pm	LECTURE 14	Cellular & biophysical models III	Marie Curie
01:00pm – 02:00pm	Lunch		PRBB Canteen
02:00pm – 03:30pm	PRACTICAL		Marie Curie
	Break		Inner square
04:00pm – 05:00pm	LECTURE 15	Cellular & biophysical models III	Marie Curie
05:00pm – 05:30pm	DISCUSSION		Marie Curie
	Break		
06:00pm	PUBLIC LECTURE	“Chinese whispers: noise in Quorum Sensing”	Ramón y Cajal
07:00pm	GOODBYE DRINK		5 th floor Terrace