

# Ph.D. student Course Molecular Neurobiology

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23 June – 1 July 2011

## Organizers:

### **Joost Verhaagen**

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### **Guus Smit**

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Graduate School Neurosciences  
Amsterdam Rotterdam

## List of speakers

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Netherlands Institute for Neurosciences Meibergdreef 47 1105 BA Amsterdam	Koen Bossers	k.bossers@nin.knaw.nl	5665512
	Joost Verhaagen	j.verhaagen@nin.knaw.nl	5665513
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	Joanna Korecka	j.korecka@nin.knaw.nl	5665500
VU University, Dept. of Neurosciences Faculty of Earth and Life Sciences De Boelelaan 1087 1081 HV Amsterdam	Ronald van Kesteren	ronald.van.kesteren@falw.vu.nl	5981161
	Marjo van der Knaap	msvanderknaap@vumc.nl	4444856
	Guus Smit	guus.smit@cncr.vu.nl	5987121
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	Sabine Spijker	sabine.spijker@cncr.vu.nl	5987003
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Shushant Jain	s.jain@vumc.nl	5988992	
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	Peter Burbach	j.p.h.burbach@umcutrecht.nl	088-7568848
Center for Society and Genetics Faculty of Earth and Life Sciences De Boelelaan 1087 1081 HV Amsterdam	Lidewij Henneman	<a href="mailto:l.henneman@vumc.nl">l.henneman@vumc.nl</a>	020-4448910
Netherlands Cancer Institute Plesmanlaan 121 1066 CX Amsterdam	Titia Sixma	t.sixma@nki.nl	020-5121959
Hubrecht Institute Uppsalalaan 8 3584 CT Utrecht	Eugene Berezikov	e.berezikov@niob.knaw.nl	030-2121973
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	Japrien Noordermeer	J.N.Noordermeer@lumc.nl	071-5269404
	Johan den Dunnen	ddunnen@HumGen.nl	071-5269421
Amsterdam Molecular Therapeutics  P.O. Box 22506 1105 BA Amsterdam	Arie van Oorschot	a.vanoorschot@amtbiopharma.com	020-5667394
Academic Medical Center P.O. Box 22660 1100 DD Amsterdam-Zuidoost	Frank Baas	f.baas@amc.uva.nl	020-5666998

## **International Guest Speakers:**

### *Swammerdam Lecture*

**Prof.dr. Joshua Sanes, Harvard University, USA**

## **Locations**

Lectures at the **VU University** (3-8 September): buildings and rooms are indicated in the program.

Explanation locations:

- HG = hoofgebouw VU = main building VU, De Boelelaan 1105, Amsterdam (e.g. 02A02 = 2nd floor, wing A, room 02.)
- WN = Wis- en Natuurkunde = science building VUA, De Boelelaan 1085, Amsterdam
- MF = Medische Faculty = building medical faculty, Van der Boechorststraat 7, Amsterdam (BK = in the basement of the building)

For route description, please see: <http://www.vu.nl/en/about-vu-amsterdam/contact-info-and-route/route-description/index.asp>

**All lectures in the Netherland** Institute for Neuroscience (9-11 September) are in the Colloquium Room at the third floor of the Institute at Meibergdreef 47, Amsterdam-Zuidoost.

For route description, please see: <http://www.nin.knaw.nl/information/route/>

## Program Ph.D. course molecular neurobiology

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Thursday 23 June 2011 (VU)

**\*WN = Science Building VU  
De Boelelaan 1085**

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09.00-09.30	Welcome and introductory remarks on the aim of the program	Guus Smit	*WN C629
<b>Basics of molecular neuroscience: the gene and gene regulation</b>			
09.30-10.15	Overview of molecular neuroscience Fundamental aspects concerning the structure of DNA and RNA, the basic organization of a gene, the process of transcription & translation.	Guus Smit	* WN C629
10.15-10.30	Coffee		
10.30-11.15	Manipulation of genes/DNA: vectors and their applications DNA is hosted in vectors. Various types of vectors are available to researchers and their applications will be discussed.	Pim van Nierop	* WN C629
11.15-12.00	The polymerase chain reaction and its applications	Pim van Nierop	* WN C629
12.00-13.00	Lunch		
<b>Basics of molecular neuroscience: the genome, what did we learn during the last 10 years?</b>			
13.00-15.00	The structure and evolution of the genome: SNPs and CNVs	Peter Heutink	* WN C629
15.00-15.30	Tea		
15.30-16.30	miRNAs: versatile regulators of gene expression	Ronald van Kesteren*	WN C629

Friday 24 June 2011 (VU)

**\*WN = Science building VU  
De Boelelaan 1085**

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## **Analysis of DNA and protein – protein interactions**

### **Sequence analysis**

09.00-10.30	<u>Practical:</u> Introduction to electronic “gene” databases: what is in it and how to use them?	Pim van Nierop	*WN C629
10.30-11.15	Protein interactions: the yeast-two-hybrid system	Guus Smit	*WN C629
11.15-12.00	Protein crystallography: application in neurobiology	Titia Sixma	*WN C629
12.00-13.30	Lunch		

### **Proteomics**

13.30-15.00	Introduction to proteomics	Ka Wan Li	*WN C623
15.00-15.15	Tea		
15.15-16.00	<u>Application:</u> Mouse models of disease; proteomics analysis of the synapse.	Guus Smit	*WN C629
16.00-17.00	<u>Demonstration:</u> mass spectrometry	Roel van der Schors	*WN C324

Monday 27 June (VU)

**\*HG= Mainbuilding VU  
De Boelelaan 1105**

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### **High-throughput gene expression analysis**

09.00-09.45	Introduction to micro-array technology	Koen Bossers *HG 14A-05
09.45-10.45	<u>Application</u> of microarray technology: global assessment of changes in gene expression following peripheral nerve injury	Ronald van Kesteren * HG 14A-05
10.45-11.00	Coffee	
11.00-11.45	LLM3D: Analysis of transcriptional regulation using computational methods	Ronald van Kesteren * HG 14A-05
11.45-13.00	Lunch	
13.00-14.00	Bioinformatics analysis of micro-array datasets: application on human brain expression data sets	Koen Bossers * HG 14A-05
14.00-15.00	Gene expression profiling using high-throughput sequencing - measuring all there is?!	Peter-Bram 't Hoen *HG 14A-05
Tea		
15.30-17.00	<u>Demonstration</u> : microarray analysis	Koen Bossers/ Joanna Korecka *WN F153

Tuesday 28 June 2011 (VU)

**\*HG = Main building VU  
De Boelelaan 1105**

**High content, medium throughput cellular screening technology**

09.00-10.00	Medium-throughput cellular screening of targets identified by micro-arrays using siRNA knock-down technology	Ronald van Kesteren * HG 14A-05
10.00-10.45	<u>Application</u> of Cellomics technology: identifying glial targets involved in neuroregeneration	Kasper Roet * HG 14A-05
10.45-11.00	Coffee	
11.00-11.45	A cell culture and phenotype screening facility at the VU/VUMC	Francesca Mela* HG 1405
11.45-13.00	<u>Demonstration</u> of Cellomics KineticScan Reader and cellular phenotype screening facility	Ronald van Kesteren/ Francesca Mela
13.00-13.30	Lunch	

**Live cellular imaging of tagged proteins**

13.30-14.30	Live imaging of GFP-tagged proteins in neurons	Ruud Toonen *HG 14A-05
14.30-15.30	Imaging structural plasticity and synaptic signaling in intact neuronal circuits	Christian Lohmann * HG 14A-05

Wednesday 29 June 2010 (NIN)

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**Genetic modification of the nervous system: in-vivo approaches**

09.00-10.00	Viral vector-mediated gene transfer: basic science and therapeutic applications	Joost Verhaagen
10.00-11.00	Gene therapy: industrial scale viral vector development for clinical trials	Arie van Oorschot
11.00-11.15	Coffee	
11.15-12.15	Transgenic mouse technology	Christiaan Levelt
12.15-13.00	Lunch	
13.00-14.00	<u>Demonstration</u> : Cold Spring Harbor video of mouse oocyte injections, ES-cell technology, uterus implantation	Christiaan Levelt
14.00-14.45	Knock-out technology	Matthijs Verhage
15.00-16.00	Random mutagenesis, forward genetics/high throughput phenotyping in mice	Matthijs Verhage

Thursday 30 June 2011 (NIN)

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**Application of molecular biology to study basic neurobiological problems**

09.00-10.00	Function of Neogenin signalling in neuronal development and axon guidance	Dianne van den Heuvel
10.00-11.00	Dopaminergic neurons: transcriptional determinants	Marten Smidt
11.00-11.15	Coffee	
11.15-12.15	Neurogenesis in the adult brain	Erno Vreugdenhil
12.15-13.30	Lunch	
13.30-14.30	Transcriptional gene networks and neuroregeneration	Matthew Mason
14.30-15.30	Dissecting addiction: the molecular approach	Sabine Spijker
15.30-16.00	Tea	
16.00 - 17.00	Society and Genomics	Lidewij Henneman

Friday 1 July 2011 (NIN)

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**Application of molecular biology to study neurological diseases**

09.00-09.45	The Netherlands Brain Bank: high quality human brain tissue to study the molecular neuropathology of brain diseases	Inge Huitinga
09.45-10.30	The molecular biology of Alzheimer's disease	Elly Hol
10.30-11.00	Coffee	
11.00-11.45	The genetics and molecular biology of retinal diseases	Arthur Bergen
11.45-12.30	Lunch	
12.30-13.30	Optogenetics to dissect impulsive behavior	Huib Mansvelder
13.30-14.30	Vanishing white matter diseases	Marjo van der Knaap

**Closing symposium of the course**

14.45-16.00	Swammerdam Lecture Joshua Sanes (Dept. of Molecular and Cellular Biology, Harvard University , Cambridge , MA , USA) Dissecting Visual Circuits in the Visual system	
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**Drinks**

**END OF COURSE**