ACS SyntheticBiology

Introducing Our Authors

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SWAPNIL BHATIA

Image courtesy of S. Banerjee Carr.

Current position: Postdoctoral Research Associate in the lab of Douglas Densmore, Department of Electrical Engineering, Boston University

Education: Postdoctoral Fellow, Palo Alto Research Center (de novo proteomics) and Boston University (algorithms for synthetic biology). Advisors: Dr. Marshall Bern at PARC, and Douglas Densmore at BU. Ph.D., Computer Science, University of New Hampshire. Advisor: Dr. Radim Bartos. B. Engg., Computer Engineering, University of Mumbai, Mumbai, India

Nonscientific interests: I like discovering how people think.

I am interested in computation in all its forms. Thinking of systems as able to perform a computation is a useful and interesting point of view. Biology presents a new model of computation that challenges many of the conventional assumptions regarding computation. I am interested in axiomatizing these new principles and using this new understanding to investigate the limits of biological programming. My related work has been in the area of computational models inspired by biology and algorithms and software tools for engineering biology. (Read Bhatia's article; DOI: 10.1021/sb400024s)

SANDER A. A. KOOIJMANS

Image courtesy of Pieter van Dorp van Vliet.

Current position: Ph.D. Candidate, Department of Clinical Chemistry and Haematology, University Medical Center Utrecht, Utrecht, The Netherlands. Advisor: Dr. Raymond M. Schiffelers

Education: M.Sc. in Pharmaceutical Sciences, Utrecht University, The Netherlands; B.Sc. in Pharmacy, Utrecht University, The Netherlands

Nonscientific interests: Traveling and experiencing different cultures, playing the guitar, visiting concerts, and watching movies

Currently, my research is focused on the exploitation of extracellular vesicles (e.g., microvesicles and exosomes) as drug delivery systems. These vesicles are promising candidates for drug delivery, given that they can very efficiently transfer a large variety of biological cargoes from one cell to the other. Hijacking this communication network for drug delivery purposes is a very challenging and exciting project, which requires full use of our molecular biology toolbox. In this work, we added a new tool to this toolbox. We describe a novel technique for the rapid ligation of small gene fragments on a magnetic bead platform, facilitating and accelerating the generation of gene constructs that would otherwise take days to weeks to develop. In addition, this technique allows for the high-throughput generation of gene libraries from predefined genetic modules. (Read Kooijmans' article; DOI: 10.1021/sb300122q).

AGNIESZKA JANINA ZYGADLO NIELSEN

Image courtesy of Per Lassen Nielsen.

Current position: Postdoctoral fellow, Dept. of Plant and Environmental Sciences, University of Copenhagen, Denmark. Advisors: Prof. Poul Erik Jensen and Prof. BirgerLindberg Møller.

Education: Ph.D. in Plant Molecular Biology, University of Copenhagen, Denmark (2005). Advisors: Prof. Poul Erik Jensen and Prof. Henrik Vibe Scheller. M.Sc. in Oncogenesis, Institut Pasteur, University of Paris VII Denis Diderot (2002). Advisor: Prof. Gérard Orth

Nonscientific interests: Spending time with my 2 boys, going cycling with them, and teaching them different languages; traveling

My Ph.D. work was based on studying protein import and membrane insertion into the plant chloroplasts. My current research focuses on using photosynthesis and in particular photosystem I as the main energy supply for metabolic pathways.

Received: May 30, 2013
Published: June 21, 2013

In this paper we demonstrate that it is indeed possible. Two P450 enzymes have been targeted into the chloroplast, and they can receive electrons directly from the linear electron flow of photosynthesis in order to synthetized the desired product. The natural NADPH regeneration system naturally used by P450s is therefore bypassed. This opens the way to light-driven biosynthesis of high-value compounds that cannot be chemically synthetized using photosynthesis to drive the reactions and plants, algae or cyanobacteria as expression platform. It is a synthetic biology approach for sustainable and efficient production of valuable natural compounds in photosynthetic organisms. (Read Nielsen's article; DOI: 10.1021/sb300128r).

MARKUS DE RAAD

Image courtesy of Markus de Raad.

Current position: Ph.D. Candidate, Department of Pharmaceutics, University of Utrecht, Utrecht, The Netherlands. Advisors: Dr. E. Mastrobattista, Dr. D. J. A. Crommelin, and Dr. P. J. M. Rottier

Education: M.Sc. in Drug Innovation, Utrecht University, The Netherlands; B.Sc. in Applied Sciences, Hogeschool Utrecht, The Netherlands

Nonscientific interests: I'm into sports (especially soccer and cycling), listening to and making music, and going to concerts/festivals

My research is focused on the design and recombinant production of combinatorial multifunctional modular peptide libraries for gene delivery purposes. We feel that future design strategies of nonviral gene delivery should follow a random but integrative approach that selects for combinations of functional traits that are optimal for efficient gene transfer. The use of a combinatorial approach is advantageous as it allows combining functional domains from existing or de novo designed peptides to create a diverse gene library encoding single, multifunctional modular peptides. To do so, we created the solid-phase platform for combinatorial and scarless multipart gene assembly. The created gene libraries can then be cloned into expression vectors and the multifunctional modular peptides can be expressed recombinantly. After purification, the multifunctional modular peptides can directly be screened on transfection efficiency. (Read Raad's article; DOI: 10.1021/sb300122q).