Sébastien ZAPPA

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Marital status: Single
Nationality: French
Born on May 18, 1975 in Brou-sur-Chantereine (France)

ACADEMIC QUALIFICATION

2005-present	***Post-doctoral position***. Research topic: Regulation of heme synthesis in *Rhodobacter capsulatus* by a LysR transcription factor, HbrL. Supervisor: Pr. Carl E. Bauer.	**Bloomington (USA)**
2002-2004	***Post-doctoral position***. Research topic: Reception and transduction of light signal by bacteriophytochromes in *Bradyrhizobium* sp. ORS278 and in *Rhodopseudomonas palustris*. Supervisor: Dr. André Verméglio.	**S^{t} Paul-lez-Durance (France)**
1999-2002	***Thèse de doctorat* (Ph.D.)**. Research topic: Alkaline phosphatase from the hyperthermophilic euryarchaeon *Pyrococcus abyssi*. Supervisor: Dr. Joseph Boudrant.	**Nancy (France)**
1995-1999	Studies at the ***ENSAIA*** *-Ecole Nationale Supérieure d'Agronomie et des Industries Alimentaires* (**National Engineering School of Agronomy and Food Sciences**) ***DEA*** *de procédés biotechnologiques et alimentaires* (**Diploma of Advanced Studies** with a specialisation in **biotechnological and food processes**)	**Nancy (France)**
1993-1995	Two-year preparation for admission to French National Engineering Schools/*Grandes Ecoles*	**Le Raincy (France)**
1993	***Baccalauréat C* (A level in Maths and Physics)** obtained with honours	**Chelles (France)**

SCIENTIFIC EXPERIENCES

2005-present — **In the course of the 2nd post-doctoral position:** — **Bloomington (USA)**
Currently in Pr. Carl E. Bauer's laboratory, *Department of Biology*, *Indiana University*, *Bloomington campus*.

Genetic and biochemical characterisation of HbrL, a LysR transcription factor, involved in heme synthesis regulation in *Rhodobacter capsulatus*: influence on photosynthetic gene expression, mechanism of action

2002-2004 — **In the course of the 1st post-doctoral position:** — **S^{t} Paul-lez-Durance (France)**
24 months at the *Laboratoire de Bioénergétique Cellulaire (Laboratory of Cellular Bioenergetics)*, head: Dr. David Pignol, CEA Cadarache

Investigating light reception by bacteriophytochromes isolated from *Bradyrhizobium* sp. ORS278 and *Rhodopseudomonas palustris*: molecular characterisation of the chromophore binding domain; investigating light signal transduction by transcription factors, PpsR: molecular and genetic approaches

2000-2002 — **In the course of the Ph.D. project:** — **Boston (USA)**
4 months in Dr. Evan R. Kantrowitz's group, *Department of chemistry, Boston College*

Investigating the secondary and quaternary structures of the alkaline phosphatase of *Pyrococcus abyssi*

8 months at the *Laboratoire de Biotechnologie des Micro-organismes Hydrothermaux* (*Laboratory of Hydrothermal Micro-organism Biotechnology*), head: Dr. Jacques Dietrich, IFREMER **Brest (France)**

Cloning of the gene encoding the alkaline phosphatase of *Pyrococcus abyssi*, expression in *Escherichia coli*, purification and characterisation of the recombinant enzyme

18 months at the *Laboratoire des Sciences du Génie Chimique (Laboratory of Chemical Engineering Sciences),* head: Dr. Michel Sardin **Nancy (France)**

Expression of the alkaline phosphatase of *Pyrococcus abyssi* in the methylotrophic yeast *Pichia pastoris* (secretion cassette construction, expression of the recombinant enzyme) and in *E. coli* using co-expression of rare-codon related tRNA

1999-2000 **Participation in the project « isolation of new antifungal activities from marine extremophilic micro-organisms »:**

1 month at the *Laboratoire de Caractérisation des Micro-organismes Marins* (*Laboratory of Marine Micro-organism Characterisation)*, head: Georges Barbier, IFREMER) **Brest (France)**

Cultivation of bacterial/archaeal thermophilic/hyper-thermophilic strictly anaerobic strains (determination of optimal growth temperatures and growth kinetics)

5 months at the *Laboratoire de Biochimie Microbienne* (*Laboratory of Microbial Biochemistry)*, head: Prof Roger Bonaly, Faculté de Pharmacie **Nancy (France)**

Detection of antifungal activities (antibiogram techniques, activity spectra)

1999 **In the course of the DEA (Diploma of Advanced Studies):**

6 months at the *Laboratoire de Fermentations et de Bioconversions Industrielles* (*Laboratory of Industrial Fermentations and Bioconversions)*, head: Prof. Pierre Germain, ENSAIA, on the topic: « Obtention of resistant variants towards narrow spectrum bacteriocins: relation between strain sensitivity and membrane lipid composition », supervisor: Dr. François Krier. **Nancy (France)**

Cultivation of lactic acid bacteria, production and partial purification of bacteriocins, activity tests and assays, generation of resistant variants, membrane fatty acid analysis

1998 **For the obtention of the biotechnology specialisation of the *ENSAIA* Engineer Diploma:**

3 months at the *Laboratoire de Fermentations et de Bioconversions Industrielles* (*Laboratory of Industrial Fermentations and Bioconversions)*, head: Prof. Pierre Germain, ENSAIA, on the topic: « Class IIa bacteriocins produced by *Carnobacterium piscicola* CP5: partial purification and genetic distribution », supervisors: Dr. Sabine Herbin and Dr. François Krier. **Nancy (France)**

Cultivation of lactic acid bacteria, production and partial purification of bacteriocins, activity tests and assays, initiation to molecular biology

SCIENTIFIC SKILLS ACQUIRED

Molecular biology: ***Cloning*** (DNA manipulation: digestion, dephosphorylation, ligation,…), ***expression*** (using bacterial –*Escherichia coli*- and yeast –*Pichia pastoris*- systems, intracellular expression and secretion, tagging of recombinant proteins for secretion or purification), rare codon-related tRNA ***co-expression***, ***site-directed mutagenesis***, ***genetic expression*** levels using reporter fusion.

Biochemistry: ***Protein purification*** (ion exchange chromatography, hydrophobic interaction chromatography, HPLC, Nickel Chelate Affinity Chromatography, Tandem Affinity Purification)
Protein analysis (electrophoresis, spectroscopy, limited proteolysis, gel filtration, sucrose-gradient sedimentation, circular dichroism)
Membrane fatty acid analysis (bacterial membrane extraction, fatty acid methylation, G.C. analysis)

Microbiology: Cultivation of ***lactic acid bacteria***, ***photosynthetic bacteria***, strictly anaerobic ***thermophilic bacteria***, ***hyperthermophilic Archaea***
Genetically modified ***methylotrophic yeast*** (*Pichia pastoris*) in ***fermentor***
Bacterial and yeast resistance towards ***antibiotics*** and ***bacteriocins*** (antibiogram, viability tests,...)

Enzymology: Two-year experience using an ***alkaline phosphatase***. Involved studies: ***Activity*** assay, influences of ***physico-chemical parameters*** (pH, temperature, buffer, metal,…), ***kinetic constant*** determination, ***inhibition*** study

Bioinformatics: Current use of nucleotide and protein sequence analysis softwares (composition, homology, alignment, etc)

SCIENTIFIC PRODUCTION

Publications:

Giraud E[1], **Zappa S[1]**, Vuillet L, Adriano J-M, Hannibal L, Fardoux J, Berthomieu C, Bouyer P, Pignol D & Verméglio A. **2005**. A new type of bacteriophytochrome acts in tandem with a classical bacteriophytochrome to control the antennae synthesis in *Rhodopseudomonas palustris*. ***J. Biol. Chem.*** 280:32389-32397
[1] : co-first auteurs

Jaubert M, **Zappa S**, Fardoux J, Adriano J-M, Hannibal L, Elsen S, Lavergne J, Verméglio A, Giraud E & Pignol D. **2004**. Light and redox control of photosynthesis gene expression in *Bradyrhizobium*: dual roles of two PpsR. ***J. Biol. Chem.*** 279:44407-44416

Giraud E, **Zappa S**, Jaubert M, Hannibal L, Fardoux J, Adriano J-M, Bouyer P, Genty B, Pignol D & Verméglio A. **2004**. Bacteriophytochrome and regulation of the photosynthetic apparatus in *Rhodopseudomonas palustris*: pitfalls of using laboratory strains. ***Photochem. Photobiol. Sci.*** 3:587-591

Zappa S, Boudrant J & Kantrowitz ER. **2004**. *Pyrococcus abyssi* alkaline phosphatase: the dimer is the active form. ***J. Inorg. Biochem.*** 98:575-581

Zappa S, Hasche A & Boudrant J. **2003**. Expression of *Pyrococcus abyssi* recombinant alkaline phosphatase: influences of *Escherichia coli* rare codons and secretion by the methylotrophic yeast *Pichia pastoris*. ***Enzyme Microb. Technol.*** 32:751-756

Zappa S, Rolland J-L, Flament D, Gueguen Y, Boudrant J & Dietrich J. **2001**. Characterization of a Highly Thermostable Alkaline Phosphatase from the Euryarchaeon *Pyrococcus abyssi*. ***Appl. Env. Microbiol.*** 67:4504-4511

Congress:

Giraud E, **Zappa S**, Vuillet L, Fardoux J, Hannibal L, Berthomieu C, Pignol D & Verméglio A. Characterization and function of the six bacteriophytochromes of *Rhodopseudomonas palustris*. **13th International Congress on Photosynthesis** (Aug. 29 to Sept. 03, 2004, Montréal, Québec, Canada)

Zappa S & Boudrant J. Expression et caractérisation de la phosphatase alcaline de l'Euryarchaeote hyperthermophile *Pyrococcus abyssi.* **1ères Journées Scientifiques de Biotechnologies**, Ferhat Abbas University of Sétif (Apr. 29 and 30, 2003, Sétif, Algeria)

Zappa S, Boudrant J & Kantrowitz ER. Secondary and Quaternary Structures of *Pyrococcus abyssi* Alkaline Phosphatase. **Biotechnology - State of the Art and Prospects of Development** (Oct. 2002, Moscow, Russia)

Zappa S, Rolland J-L, Flament D, Gueguen Y, Boudrant J & Dietrich J. Characterization of a Highly Thermostable Alkaline Phosphatase from the Euryarchaeon *Pyrococcus abyssi*. **CBSO** (Club de Bioconversion et de Synthèse Organique, May 2001, La-Londe-lès-Maures, France) and **Biotrans2001** (Sept. 2001, Darmstadt, Germany)

Lectures:

On the role of bacteriophytochromes in photosynthetic Eubacteria. 20 September 20, 2005. Swammerdam Institute for Life Science, Amsterdam, the Netherlands. Invited by Pr. Klaas Hellingwerf.

Bacteriophytochromes from *Rhodopseudomonas palustris* and *Bradyrhizobium* sp. August 2, 2005. Sfb498, Freie Universität Berlin, Berlin, Germany. Invited by Pr. Tilman Lamparter.

Regulations by bacteriophytochromes in *Bradyrhizobium* sp. and *Rhodopseudomonas palustris*. July 14, 2005. University of California, Davis, U.S.A. Invited by Dr. J. Clark Lagarias.

SKILLS

Languages	French: mother tongue English: fluent (Cambridge FCE obtained in 1996) German: school notions
Computer	Current use of the Microsoft applications on PC or Macintosh environments
Teaching	Supervision of nine undergraduate students on 1 to 6 months training periods since 1999.
Miscellaneous	Clean driving licence

REFEREES

Pr. Carl E. Bauer	*Professor* Department of Biology Indiana University Myers Hall, Rm 150 915, E. Third St. Bloomington, IN 47405-7170, USA	tel.: 001.812.855.6595 fax: 001.812.855.6705 cbauer@bio.indiana.edu
Dr. André Verméglio	*Research Director* DEVM-LBC, CEA-CNRS-Université Aix-Marseille II UMR6191 CEA de Cadarache, Bât. 156, 13115 St Paul-lez-Durance CEDEX, France	tel. : 33.4.42.25.46.30 fax : 33.4.42.25.47.01 avermeglio@cea.fr
Dr. David Pignol	*Research Director* DEVM-LBC, CEA-CNRS-Université Aix-Marseille II UMR6191 CEA de Cadarache, Bât. 156, 13115 St Paul-lez-Durance CEDEX, France	tel. : 33.4.42.25.30.60 fax : 33.4.42.25.47.01 david.pignol@cea.fr
Dr. Joseph Boudrant	*Research Director* LSGC-GPBA, CNRS UPR 6811 ENSAIA-INPL 2, avenue de la Forêt de Haye, BP 172, 54500 Vandoeuvre-lès-Nancy, France.	tel.: 33.3.83.59.58.60 fax: 33.3.83.59.57.96 Joseph.Boudrant@ensaia.inpl-nancy.fr
Dr. Jacques Dietrich	*Research Director* Station Méditerranéenne de l'Environnement Littoral IFREMER-CNRS 1, quai de la Daurade 34200 Sète, France.	tel.: 33.4.67.46.33.75 fax: 33.4.67.46.33.99 Jacques.Dietrich@ifremer.fr

PERSONNAL INTERESTS AND ACTIVITIES

Backpacking	China (1997), Nepal (1998), Laos (2004), India (2005), French Guyana and Surinam (2005)
Martial arts	Capoeira Angola Wing Chun Kung Fu (4-year practice) Karatedo Wadoryu (black belt 1st dan) Basic practice of internal martial arts (Xing Yi Quan, Yi Quan, Tai Ji Quan)
Music	Formerly guitar and bass player in several bands
Other	Reading, cinema, surfing