

# Marcell Nikolausz, PhD

## *Curriculum vitae*

### **Personal data:**

Date of birth: 06<sup>th</sup> August 1974

Nationality: Hungarian

Marital status: Married with two children

Department of Bioenergy (BEN) –Biogas Microbiology Research Group

Helmholtz Centre for Environmental Research - UFZ

in cooperation with the German Biomass Research Centre (DBFZ)

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### **EDUCATION:**

1988-1992. Studies at the Vörösmarty Mihály Secondary School, specialised in biology

1992-1998. Studies at the Eötvös Loránd University of Science, Faculty of Science Biology  
Masters Course (Diploma result - very good)

1998-2003. PhD studies at the Eötvös Loránd University of Sciences, Department of  
Microbiology (PhD result - Summa cum laude)

1995. State intermediate level stage language examination in English (c-type)

### **Postdoctoral positions:**

2003-2005. Marie Curie Development Host Fellow at (Project: BIOISOTOPE, contract:  
EVK1-CT-2000-56120)

2005 - 2009 Research fellow at UFZ, Department of Bioremediation

2010 - Research fellow at UFZ, Department of Bioenergy

### **Research stays abroad and training courses:**

- UNIDO ICS, Training Course on Soil Environmental Assessment and Bioremediation Technologies, Budapest, 1997.
  - Vrije Universiteit Brussel, Belgium, 3 months, TEMPUS scholarship (IEF, multiplex PCR, FISH), 1998
  - Natural History Museum, London, 1 month, Short-term Scientific Mission in the COST(833) framework, 1999.
  - Research stay at the Department of Bioremediation, UFZ, 3 months, 2002.
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### **RESEARCH EXPERIENCES:**

**Master Thesis: [1998]** Eötvös Loránd University of Science, Faculty of Science, Department of Microbiology (Supervisor Dr. Gábor Kovács)

- Assessment of the diversity of cattail (*Typha angustifolia*) rhizosphere bacterial communities using 16S rRNA-based molecular approach. (**The first environmental microbiological study in Hungary using cultivation independent molecular tools.**)

**Doctoral Research: [1998 - 2003]** Eötvös Loránd University of Science, Faculty of Science, Department of Microbiology (Supervisor Dr. Károly Márialigeti)

- Molecular biodiversity approaches in the environmental microbiology and their application to investigate rhizosphere-rhizoplane microbial communities.
- Comparison of molecular fingerprinting techniques in the assessment of microbial diversity. (**Pioneer study in Hungary in the application of DGGE, ARDRA and T-RFLP**)
- Comparison of cultivation-based and molecular approaches in the investigation of microbial communities associated to the gill tissue of eel (*Anguilla anguilla*).
- Molecular taxonomical study of a European *Cryptosporidium andersoni* isolate.

**Marie Curie Development Host Fellowship: [2003 - 2005]** Helmholtz Centre for Environmental Research UFZ, Department of Bioremediation, Research project

#### Assessment of natural attenuation applying stable isotope and molecular biological techniques

- Phylogenetic affiliation of new DCM-degrading Hyphomicrobium strains
- Comparison of 16S rRNA and DCM dehalogenase gene-based phylogeny
- Investigation on the probability of horizontal gene transfer and the evolution of catabolic pathways
- Determination of stable isotope fractionation factors for several DCM-degrading strains
- Comparison of different fractionation factors between different strains and linking variations to polymorphism of functional genes (DNA and protein level) encoding DCM dehalogenase
- Molecular detection of potential dechlorinating bacteria by taxon-specific PCR
- Assessment of the natural attenuation of chlorinated ethenes in Bitterfeld aquifer. The first combined application of molecular biological detection methods and stable isotope fractionation tools.

**Postdoctoral research (2005 - 2009)** Helmholtz Centre for Environmental Research UFZ, Department of Bioremediation

#### Elucidation of microbial processes in the the rhizosphere of constructed and natural wetland plants

- Analysis of the structure of rhizosphere microbial communities involved in phytoremediation processes using different molecular tools
- Investigation of activity changes of rhizosphere bacteria as a function of diurnal redox fluctuation
- Monitoring of the elimination of potential pathogen microorganisms during wastewater purification
- Investigation of microbial communities involved in the degradation of BTEX compounds in constructed wetlands treating contaminated groundwater
- Investigation of the nitrogen cycle in the rhizosphere

#### Deciphering the structure and function of microbial communities in environmental systems

- Application of multiplex detection methods for different bacterial taxa by using single nucleotide primer extension (SNUPE) first time in microbial ecology
- Application of substrate mediated isotope tracer techniques to elucidate the microbial community involved in the degradation of different xenobiotic compounds. Development of a novel concept based on radio isotope probing (RIP) and improvement of stable isotope probing via taxon specific separation of nucleic acids.
- Linking microbial community structure, activity and function.
- Investigations on biases associated with molecular techniques (DGGE sequence retrieval, PCR, molecular cloning)
- Improvement of sequence retrieval from denaturing gradient gels
- Assessment of the anaerobic ammonia oxidation in the aquifer

#### Monitoring of Natural Attenuation (NA)

- Multiplex detection of potential degraders involved in natural attenuation processes
- Estimation of NA potential using molecular and isotope labelling tools in contaminated sites
- Monitoring of the dynamics of microbial populations in enrichment cultures for the improvement of isolation and cultivation of bacteria degrading contaminants
- Investigation of microbial communities involved in the degradation of chlorinated ethenes

**Recent research (2010 -)** Helmholtz Centre for Environmental Research UFZ, Department of Bioenergy.

Renewable energies: Methane from biomass via microbiological processes

- Investigation of microbial communities involved in the biogas process
- Microbiological process optimization based on functional analysis of biogas communities
- Microbial bioresource exploration to improve bioenergy production
- Combined application of isotope fingerprinting and gene-expression based molecular analysis for the assessment of the activity of methanogens

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**TEACHING EXPERIENCES:**

**Student training**

Training and supervision of PhD and Master students (2003-present)

**Laboratory Supervision**

- Supervision of students and technicians in microbiology and molecular biology (1998 - present)
- Leader of the molecular biology laboratory of the Department of Bioremediation (2005 - 2009)
- Supervision of guest scientists

**Practical course**

- Annual practical course of Eötvös Loránd University in general microbiology and molecular microbiology (1998-2003)
- Annual practical course of Leipzig University in environmental microbiology (Praktikum Umweltmikrobiologie, 2005-present)

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**SCIENTIFIC RECORD:**

**Awards:**

- Scholarship of the Hungarian Republic, Grant for outstanding students, 1997
- Outstanding Student of the Faculty, 1998
- TDK (scientific student competition) 1<sup>st</sup> prize, 1998

**Projects and proposals:**

Marie Curie Host Fellowships for the Transfer of Knowledge (ToK)

*Isotope tools for combined investigation of structure and function in microbial communities (ISOTONIC)*

Main participant and supervisor of a postdoctoral fellow

**Reviewer of scientific journals:**

FEMS Microbiology Ecology, BioTechniques, Biodegradation, Biotechnology and Applied Biochemistry, Acta Biologica Hungarica, Community Ecology, Journal of Nanoscience and Nanotechnology, Bioresource Technology, Journal of Hazardous Materials

**Organizer:**

- Member of the Local Organizing Scientific Committee of the ISEB/ESEB/JSEB 2006 conference.
- Head of the Local Organizing Committee of the „1<sup>st</sup> International Conference on Biogas Microbiology, 2011”

**Membership:**

- Vereinigung für Allgemeine und Angewandte Mikrobiologie (VAAM)
- Hungarian Society for Microbiology (MMT)

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**Publications:**

Number of publications:	27 articles in peer-reviewed journals
Cumulative impact factor:	70.223
Total number of citations:	321
h-index:	9

- Imfeld, G., Pieper, H., Shani, N., Rossi, P., **Nikolausz, M.**, Nijenhuis, I., Paschke, H., Weiss, H., Richnow, H.H. (2011) Characterization of groundwater microbial communities, dechlorinating bacteria, and in situ biodegradation of chloroethenes along a vertical gradient. *Water Air & Soil Poll.* **222**(1-4):107-122.
- Sivaraman, C., Ganguly, A., Nikolausz, M., Mutnuri, S. (2011) Isolation of hydrocarbonoclastic bacteria from bilge oil contaminated water. *Int. J. Env. Sci. Tech.* **8**(3): 461-470.
- Felföldi, T., Duleba, M., Somogyi, B., Vajna, B., **Nikolausz, M.**, Présing, M., Márialigeti, K., Vörös, L. (2011) Diversity of photoautotrophic picoplankton, seasonal dynamics of picocyanobacterial genotypes and their relation to environmental variables in a large, shallow lake (Lake Balaton, Hungary). *Aquat. Microb. Ecol.* **63**(3):273-287.
- Palatinszky, M., **Nikolausz, M.**, Sváb, D., Márialigeti K. (2011) Preferential ligation during TA-cloning of multitemplate PCR products – a factor causing bias in microbial community structure analysis. *J. Microbiol. Meth.* **85**(2):131-136.
- Cichocka, D., **Nikolausz, M.**, Haest, P.J., Nijenhuis, I. (2010) Tetrachloethene conversion to ethene by a Dehalococcoides-containing enrichment culture from Bitterfeld. *FEMS Microbiol. Ecol.* **72**(2):297-310.
- Imfeld, G., Aragonés, C.E., Fetzer, I., Mészáros, É., Zeiger, S., Nijenhuis, I., **Nikolausz, M.**, Delerce, S., Richnow, H-H. (2010) Characterization of microbial communities in the aqueous phase of a constructed model wetland treating 1,2-dichloroethene-contaminated groundwater. *FEMS Microbiol. Ecol.* **72**(1):74-88.
- Jousset, A., Lara, E., **Nikolausz, M.**, Harms, H. and Chatzinotas, A. (2010) Application of the denaturing gradient gel electrophoresis (DGGE) technique as an efficient diagnostic tool for ciliate communities in soil. *Sci. Total Env.* **408**(5):1221-1225.
- Franchini, A. G., **Nikolausz, M.\*** and Kästner, M.(2009) Sequence Specific Primer Extension RNA Analysis (SeSPERA) for the investigation of substrate utilization of microbial communities. *J. Microbiol. Meth.* **79**:111-113.
- Nikolausz, M.\***, Chatzinotas, A., Palatinszky, M., Imfeld, G., Táncsics, A. and Kästner, M. (2009) Evaluation of single-nucleotide primer extension for detection and typing of phylogenetic markers used for the investigation of microbial communities. *Appl. Environ. Microbiol.* **75** (9):2850-2860.
- Hall, M. J. R., Adams, Z. J. O., Wyatt, N. P., Testa, J. M., **Nikolausz, M.**, Farkas, R. and Ready, P. D. (2009) Morphological and mitochondrial DNA characters for identification and phylogenetic analysis of the myiasis-causing flesh fly *Wohlfahrtia magnifica* and its relatives, with a description of *Wohlfahrtia monegrosensis* sp. n. Wyatt & Hall. *Med. Vet. Entomol.* **23**: 59-71.
- Nikolausz, M.\***, Chatzinotas, A., Palatinszky, M., Imfeld, G., Táncsics, A. and Kästner M. (2009) The single-nucleotide primer extension (SNuPE) method for the multiplex detection of various DNA sequences: from detection of point mutation to microbial ecology. *Biochem. Soc. Trans.* **37**: 454-459.
- Liu, Y., **Nikolausz, M.**, Wang, X. C. (2009) Biodegradation and detoxication of phenol by using free and immobilized cells of *Acinetobacter* sp. XA05 and *Sphingomonas* sp. FG03. *J. Environ. Sci. Health, Part A.* **44** (2): 130-136.
- Bailón, L., **Nikolausz, M.**, Kästner, M., Veiga, M. C. and Kennes C. (2009) Removal of dichloromethane from waste gases in one- and two-liquid-phase stirred tank bioreactors and biotrickling filters. *Water Res.* **43** (1): 11-20.
- Liu, Y., **Nikolausz, M.**, Jin, P. K. (2008) Abundance and diversity of sulphate-reducing bacteria within a crude oil gathering and transferring system in China. *Ann. Microbiol.* **58** (4): 611-615.
- Nikolausz, M.\***, Kappelmeyer, U., Székely, A., Ruzsnyák, A., Márialigeti, K. and Kästner M. (2008) Diurnal redox fluctuation and microbial activity in the rhizosphere of wetland plants. *Eur. J. Soil. Biol.* **44**: 324-333.

- Imfeld, G., Nijenhuis, I., **Nikolausz, M.**, Zeiger, S., Paschke, H., Drangmeister, J., Grossmann, J., Richnow H-H. and Weber S. (2008) Assessment of in situ degradation of chlorinated ethenes and bacterial community structure in a complex contaminated groundwater system. *Water Res.* **42** (4-5): 871-882.
- Nikolausz, M.\***, Chatzinotas, A., Palatinszky, M., Imfeld, G., Martinez, P. and Kästner M. (2008) A single-nucleotide primer extension assay for the detection and typing of *Dehalococcoides* sequences. *Appl. Environ. Microbiol.* **74**: 300-304.
- Nikolausz, M.\***, Palatinszky, M., Ruzsnyak, A., Richnow, H-H., Kappelmeyer, U., Kästner, M. (2007) Novel approach using substrate-mediated radiolabelling of RNA to link metabolic function with the structure of microbial communities. *FEMS Microb. Lett.* **274**: (1): 154-161.
- Sipos, R., Székely, A. J., Palatinszky, M., Révész, S., Márialigeti, K., **Nikolausz, M.\*** (2007) Effect of primer mismatch, annealing temperature and PCR cycle numbers on 16S rRNA gene targeting bacterial community analysis. *FEMS Microbiol. Ecol.* **60**: 341-350.
- Nijenhuis, I., **Nikolausz, M.**, Köth, A., Felföldi, T., Weiss, H., Drangmeister, J., Großmann, J., Kästner, M., Richnow H-H. (2007) Assessment of the natural attenuation of chlorinated ethenes in an anaerobic contaminated aquifer in the Bitterfeld/Wolfen area using stable isotope techniques, microcosm studies and molecular biomarkers. *Chemosphere.* **67**: 300-311.
- Nikolausz, M.**, Nijenhuis, I., Ziller, K., Richnow, H-H., Kästner, M. (2006) Stable carbon isotope fractionation during degradation of dichloromethane by methylotrophic bacteria. *Environ. Microbiol.* **8**(1):156-164.
- Nikolausz, M.\***, Kappelmeyer, U., Nijenhuis, I., Ziller, K., Kästner, M. (2005) Molecular characterization of dichloromethane-degrading *Hyphomicrobium* strains using 16S rDNA and DCM dehalogenase sequences. *Syst. Appl. Microbiol.* **28**:582-587.
- Vacca, G., Wand, H., **Nikolausz, M.**, Kuschik, P., Kästner, M. (2005) Effect of plants and filter materials on microbial communities in pilot-scale constructed wetlands. *Water Res.* **39** (7): 1361-1373.
- Nikolausz, M.\***, Sipos, R., Révész, S., Székely, A., Márialigeti, K. (2005) Observation of bias associated with re-amplification of DNA isolated from denaturing gradient gels. *FEMS Microbiol. Lett.* **244** (2): 385-390.
- Nikolausz, M.**, Kovács, G., Márialigeti, K. (2004) Comparison of RNA- and DNA-based species diversity investigations in rhizoplane bacteriology with respect to chloroplast sequence exclusion. *J. Microbiol. Meth.* **56**:365-373.
- Micsinai, A., Borsodi, A., Csengeri, V., Oravecz, O., **Nikolausz, M.**, Reskóné, M. N., Márialigeti, K. (2003) Seasonal differences in the rhizome-associated bacterial community structure of healthy and declining reed stands in Lake Velencei, Hungary. *Hydrobiologia* **506-509**: 707-713.
- Sréter, T., Egyed, Zs., Széll, G., Kovács, G., **Nikolausz, M.**, Márialigeti K., and Varga, I. (2000) Morphologic, host specificity and generic characterization of a european *Cryptosporidium andersoni* isolate. *J. Parasitol.* **86**:1244-1249.

\* Marcell Nikolausz was correspondent author of these articles