



# Participant Profile

for the  
**Turkish-German Strategy Workshop 2006**  
**TÜBİTAK Marmara Research Center,**  
**Istanbul- Gebze Turkey**  
**13 – 15 December 2006**



International Bureau (IB)  
of the Federal Ministry of  
Education and Research  
(BMBF)

## 1. Contact details and personal information

<b>Name:</b>	Zehra Sayers	<b>Phone:</b>	90-216 483 9509
<b>Role/function<sup>1</sup>:</b>	Prof., Group leader	<b>Fax:</b>	90-216 483 9550
<b>Institution:</b>	Sabanci University	<b>E-Mail:</b>	zehra@sabanciuniv.edu
<b>Department:</b>	Biological Sciences and Bioengineering	<b>Website:</b>	
<b>Address:</b>	Sabanci University, Orhanli Tuzla	<b>Organisation type<sup>2</sup>:</b>	University
<b>Postcode and City:</b>	34956, Istanbul		

<sup>1</sup> **Role/function** e.g. working group leader, managing director, postdoc, PhD etc.

<sup>2</sup> **Organisation type** e.g. university, research institution, small and medium enterprise (SME), industry etc.

### Working Group:

- 1 Material Technologies
- X2 Biotechnology, Genomics and Food
- 3 Energy
- 4 Information and Communication Technologies
- 5 Environmental Protection, Climate Change and Sustainable Development

### Areas of activity:

- Xresearch
- Xtechnology development
- demonstration
- Xtraining
- Xdissemination
- other:

### Keywords characterising your area of research:

**Please choose the appropriate key words (max. 5) from the following list:**  
<http://www.cordis.lu/fp6/keywords>  
 03.02.02.01.00.00.00 Genetic engineering, 03.02.03.05.00.00.00 Cell biology,  
 03.02.03.23.00.00.00 Structural biology, 04.06.03.00.00.00.00 Biophysics,  
 04.06.03.02.00.00.00 Molecular biophysics

### Expertise, technologies and infrastructures available in your institution:

**Research activities / expertise:** Structural and functional analysis of proteins and nucleic acids. Particular systems are plant metallothioneins and plant G-proteins.

**Methods:** Molecular biology techniques for cloning and over-expression of recombinant proteins, protein purification and characterisation methods and X-ray scattering and diffraction techniques for 3D structure determination using synchrotron radiation.

**Key technologies:** Recombinant DNA, optical spectroscopy, synchrotron X-ray

**Infrastructures:** Basic infrastructure for cloning, expression, purification, biochemical and biophysical characterization of proteins

#### Key publications:

- Z. Sayers, M. H. J. Koch, S. B. Whitburn, K. M. Meek, G. F. Elliott and A. Harmsen (1982). Synchrotron X-ray Diffraction Study of the Structure of Corneal Stroma. *J. Mol. Biol.* 160, 593-607.
- Z. Sayers, M. H. J. Koch, J. Bordas and U. Lindberg (1985). Time Resolved X-ray Scattering Study of Actin Polymerization from Profilactin. *Eur. Biophys. J.* 13, 99-108.
- M. H. J. Koch, E. Dorrington, R. Kläring, A. M. Michon, Z. Sayers, R. Marquet and C. Houssier (1988). Electric Field X-ray Scattering Measurements on Tobacco Mosaic Virus. *Science* 240, 194-196.
- Z. Sayers, A. M. Michon, P. Sicre and M. H. J. Koch (1990). Structure and Assembly of Calf Hoof Keratin Filaments. *J. Struct. Biol.* 103, 212-224.



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Bilecen, K., Öztürk, Ü.H., Duru, A.D., Sütlü, T., Petoukhov, M., Svergun, D. I. , Koch, M.H.J., Sezerman, U., Cakmak, I. and Sayers, Z. (2005) *Triticum durum* metallothionein: isolation of the gene and structural characterization of the protein using solution scattering and molecular modeling. *Chem. 280(14):13701-13711.*

Ozturk L, Yazici MA, Yucel C, Torun A, Ozkan H, Braun HJ, Sayers Z. and Cakmak I. (2006) Concentration and localization of zinc during seed development and germination in wheat. *Physiol Plant.128, 144-152.*



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## 2. Past and present research collaborations

Are you familiar  
with the European  
Framework  
Programme?

<input type="checkbox"/> Yes X	<input type="checkbox"/> No
<input type="checkbox"/> with Framework Programme 5	
<input type="checkbox"/> with Framework Programme 6	
<input type="checkbox"/> with Framework Programme 7	

EU-projects you are  
involved in:  
Past projects

Programme title / contract number / title / acronym / your function  
(coordinator / partner / contractor)

Present projects

Other international  
collaborations:

Juelich Research Center – TÜBİTAK Bilateral Grant for research on wheat metallothionein structure. 2002 TBAG-U/34 (101T177) and 2006 TBAG-U/157 (105T535)

Name(s) and  
contact details of  
potential partners:

If you would like to suggest the participation of particular partners from the partner country based on existing contacts or collaboration experience, you are welcome to indicate their names and contact details below:

Dr. M. Koch, [koch@embl-hamburg.de](mailto:koch@embl-hamburg.de)

Dr. D. I. Svergun, EMBL Hamburg, [svergun@embl-hamburg.de](mailto:svergun@embl-hamburg.de)

Dr. M. Roessle, EMBL Hamburg, [Manfred.roessle@embl-hamburg.de](mailto:Manfred.roessle@embl-hamburg.de)

## 3. Presentation at the Workshop

I will give a presentation at the workshop (approx. 10 min.) to present my institution, my expertise, and my collaboration interests. The contents of my presentations is summarised below (max. 1 page).

Structural Analyses on *T. durum* metallothionein

Metallothioneins (MTs) are small cysteine-rich polypeptides found in almost all organisms from bacteria to plants and animals. In general, they are involved in heavy-metal detoxification and metabolism of essential trace elements like copper and zinc. In mammalian MTs metal-binding is achieved through the formation of thiol bonds with the metal ions. Plant MTs have been classified into 4 types according to the distribution of cysteines in the protein sequence but their regulation and function are not yet fully understood .

The high metal binding capacity for different metals (Cd, Zn, Ag, Hg, Au etc.) make MTs highly valuable for detoxification, remediation and recycling in agricultural areas and for development of metal microsensors for environmental and therapeutic purposes. Such applications are facilitated by structural investigations that aim to determine the 3D structure of the protein and the geometry of the metal binding center. Although there are reports of structural analysis of fungal and mammalian proteins such studies are hitherto non-existent for plant MTs.

A novel gene coding for a type I MT in wheat *T. durum* was identified by our group and the corresponding recombinant durum MT (dMT) was expressed in *E. coli*. Parallel to biochemical characterization of the purified recombinant protein, preliminary structural investigations by X-ray solution scattering at EMBL Hamburg Outstation were carried out in the course of the previous project supported by TÜBİTAK-Julich (TBAG-U/34 (101T177)). Our results suggested that the Cd-binding dMT has an extended dumbbell structure in solution and the structural model that emerged suggested that the hinge region between the metal-binding domains may be a site for protein-protein or protein DNA interactions (Bilecen et al., 2005).

Bilecen K, Öztürk ÜH, Duru AD, Sütlü T, Petoukhov M, Svergun, DI , Koch, MHJ, Sezerman, U, Cakmak, I and Sayers, Z (2005) *Triticum durum* metallothionein: isolation of the gene and structural characterization of the protein using solution scattering and molecular modeling. *J. Biol. Chem.* 280(14):13701-13711.



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**I agree with the publication of my data on the Workshop website!**

**PLEASE FILL IN THIS FORM **UNTIL 22 SEPT. 2006** AND RETURN IT TO:**

**Internationales Buero des BMBF**  
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