

Centre of Excellence for Chemical Environmental Studies at the Faculty of Chemistry of Adam Mickiewicz University

H. Koroniak, A. Molski, G. Schroeder*

Faculty of Chemistry, Adam Mickiewicz University, Grunwaldzka 6, 60-780 Poznań, Poland

Environmental protection, environmentally friendly technologies, concern for the purity of air, water and soil, and other related problems are nowadays not only of highest priority in scientific research, but also very important from legislative and economic points of view. One quite often hears in the media that chemistry and chemical technology are to be blamed for pollution, environmental hazards and all disastrous environmental events. However, what is missing is the fact that improvements in environmental protection, environmental monitoring, and environmentally safe industrial technologies have continuously been achieved as a result of the work of chemists and chemical technology professionals. This medial misunderstanding of the roles of chemistry and chemical technology may stem from an oversimplified thesis that what comes from Nature is pleasant and healthy, whereas chemistry is viewed as generating nasty artificial goods.

To take care of the future of our environment, it is not enough to engage managers and administrators. This work need to be done, and will be done by professionally prepared and trained specialists having deep knowledge in chemistry, biology, physics, medicine, pharmacy, toxicology, etc. This line of thinking was the key point in our proposed Chemical Environmental Studies – Strengthening European Dimension (CHENVIR), which has been submitted to the European Commission. The project has been accepted, and became effective February 1st, 2003. Since that day Faculty of Chemistry of Adam Mickiewicz University has become a Centre of Excellence for Chemical Environmental Studies

The Faculty of Chemistry has been a separate research and teaching unit of Adam Mickiewicz University since

1981. Faculty of Chemistry has grown to become a major centre for research, as well as undergraduate and graduate training in Poland. There are presently 67 faculty members, over 800 undergraduate students, and over 90 graduate students. The Faculty offers curricula in physical, organic and inorganic chemistry, and is committed to research and training in almost all areas of modern chemistry with strong emphasis on environmental chemistry.

The Faculty comprises 29 Departments, a Technological Centre, Instrumental Analysis Facility, the Faculty Library, and electronic and machine workshops. The Faculty of Chemistry with an academic staff of over 167, including 67 professors engaged in research in almost all fields of modern chemistry, has the right to confer the academic degree of doctor (Ph. D.) and doctor habilitated (D. Sc.) in organic, inorganic, physical and theoretical chemistry. Faculty members co-operate with a number of research centres all over the world. This includes joint research projects and visits of research fellows and visiting professors.

The research work at the Faculty is conducted in physical, inorganic, organic chemistry with particular emphasis on environmental aspects. The Faculty is devoted to both basic and applied research in a broad range of topics with a focus on micro- and macro-environmental aspects of chemistry. This ranges from theoretical and experimental studies of small inorganic and organic molecules and their reactions, through studies of molecules/polymers of biological relevance, to heterogeneous catalysis and environmental biotechnology. The Instrumental Analysis Facility provides high-tech equipment supporting experimental studies, for instance sub-pico-second fluorescence spectroscopy, IR spectroscopy, mass spectroscopy, EPR and NMR spectroscopy, X-ray diffractometry. The faculty has access to the university computer network and to the municipal super-computer centre.

*Corresponding author

Faculty of Chemistry offers several educational programs: 5-year undergraduate studies in Chemistry or Environmental Chemistry leading to the degree of Master of Science, 3-year vocational studies in Chemical Synthesis and Analysis, and 4-year graduate studies leading to the degree of Doctor of Science (Ph. D). Overall enrollment in the 2000/2001 academic year approached 900.

Over the last decade the Faculty has undertaken a strong effort to adapt its structure and activities to the changing situation in which we operate. A major effort has been put into focusing our research and training activities around chemistry viewed as an integral part of environmental studies. This was possible since at that time the Faculty had already some foundation in environmental aspects of inorganic, organic and physical chemistry. The role assigned to chemistry in environmental studies as the major thematic priority of the Faculty was confirmed by the creation of a new specialisation, Environmental Chemistry, carrying research and student training. However, some relevant research/teaching areas are underrepresented (biochemistry), or missing (biophysics, data modelling) at our Faculty.

The faculty has been continuously supporting research in basic and applied chemistry, targeting micro and macro environmental problems. This has been paralleled by participation in local environmental protection projects, and by developing links with local industry. For example, our Department of Water Treatment Technology is participating in the modernization of a major water treatment plant for the city of Poznań. In connection with this project an analytical laboratory has been organized and, based on its research, a new technology is currently being implemented.

Over the years the faculty has enhanced its multidimensional links with the city of Poznań and neighbouring local communities. For example, our representatives participate in Graduation Exams in selected high schools, to guarantee a high level of chemistry exams and to present to prospective students opportunities in higher education in chemistry. We are actively involved in raising environmental awareness through publications in the local press, and our regular presence at an annual Science Festival organized in the city of Poznań. Last year the Faculty opened a licentiate level course (3 year curriculum) in material chemistry in a local university centre in the city of Śrem, near Poznań. A similar licentiate chemistry course will be offered next academic year (2002/2003) in the city of Kościan near Poznań. These initiatives emerged in close cooperation with local authorities, and answer directly the needs of the communities they represent.

The faculty offers graduate (Ph.D) courses in chemistry. In the last three years international visiting scientists have run the courses. This deliberate policy of the faculty aims at raising teaching standards, promoting diversification of courses, and increasing international awareness of the students. It is important for the faculty not only to guarantee the presence of international teachers at the

graduate school, and but also to extend those courses to undergraduate students, in particular in local centres.

The faculty considers the focus on environmental chemical studies a direction for future development. In this connection a new challenge to the faculty is related to the prospective integration of the faculty into the European science and technology (S&T) community. This has prompted us to apply for support from the European Union in the form of a Centre of Excellence. The title of our project was Chemical Environmental Studies: Strengthening European Dimensions (CHENVIR). This title brings out the major objective of the Centre: transformation of the faculty from a major research and training centre in Poland into a corresponding position in the EU.

The current international status of the faculty can be assessed by the number of visits (around 20 annually) to the faculty, and the number of publications (over 300 annually) published in peer-reviewed journals. However, our participation in activities of the EU S&T community does not correspond to our potential. To amend this unsatisfactory situation we need to broaden our links with the EU scientific community. Specifically, the Centre will support:

1. Strengthening links with the European S&T Community (twinning study visits to and from European academic and industrial sites to identify potential European partners)
2. Promoting priority research areas (support for introduction and development of biochemistry, biophysics, and data modelling, i.e. areas that are relevant for chemical environmental studies, but are underrepresented at the faculty)
3. Internalisation of teaching and training (support for the presence of international teachers and students at the faculty)
4. Reaching out to local communities (stimulating local communities through internationalization of teaching at the university sites in Śrem, Kościan)

The faculty has already addressed all these objectives. However, limited funds slow progress, and, therefore, we see help from the EU as indispensable for further development. Specifically:

1. We consider the level of participation of the faculty in activities of EU S&T community as unsatisfactory. Although faculty members have developed individual contacts with their European colleagues, this has not resulted in a strong presence of the faculty in the 5FP programs. We are convinced that our potential in chemical environmental studies offers possibilities for successful cooperation with European research and industrial centres. However, to identify European partners we need to be able to make and receive exploratory visits to and from European research and industry centres. At present the faculty has no funds for this purpose.
2. Further development of chemical environmental studies at the faculty requires support for relevant research areas (biochemistry, biophysics, data modelling) that

are underrepresented at the faculty. A necessary condition for development is the active participation of faculty members at scientific meetings in those areas, and their presence at leading European centres. In order to establish strong new research and training programs, the faculty needs to be able to invite experts, and to organize scientific meetings for European and Polish scientists.

3. We are proud that international teachers have run courses for graduate (PhD) students at the Faculty. However, in order to invite top rank scientists to teach at the Faculty on a regular bases, we need to be able to offer them compensation commensurate with their standing. At present this is not possible, nor is it possible to increase the number of international courses and to extend them to undergraduate students. There have been about four international lecturers teaching annually at the graduate school. Our goal is to double this number. The level of presence of international students at the faculty is also considered unsatisfactory. We have applicants (mostly from other pre-access countries) that have been rejected due to lack of funds for stipends. We will enhance the presence of international teachers and students at the faculty through complementary support received through the CHENVIR Centre.
4. Students at local university centres (Śrem, Kościan) have less chance to develop European awareness than their colleagues from large cities. It is vital to provide all students with teaching and training of equal quality. The European dimension of teaching needs to be realised by the presence of international teachers. Due to the economic situation, neither the local authorities, nor the university can afford to support that standard of diversity. Help from the EU would allow us to bring international teachers to those local communities.

The work plan of the Centre is divided into four packages, whose implementation will promote the European dimension of chemical environmental studies at the faculty, and enhance the positive influence exerted by the faculty on local communities.

Package 1: *Strengthening links with the EU* consist of study visits to and from academic and industrial centres of environmental studies, in order to establish new, and strengthen the existing links with the European S&T community, and an annual information workshops for potential EU and Polish partners. The objectives of Package 1 are: to present the faculty to European sites/centres, to quantify the current standing of the faculty in the European S&T community, to identify potential EU partners for networking and twinning arrangements,

to identify expectations and needs of EU partners, to establish twinning arrangements with EU partners, to enter a EU thematic network of centres.

Package 2: *Promoting priority research areas* consists of exchange research visits of scholars representing priority research areas at the Faculty (biophysics/biochemistry/data modelling), participation and organisation of scientific conferences/workshops in those research areas, and support for acquisition of books and journals in the priority research areas. The objectives of Package 2 are to promote diversification of research areas pursued at the Faculty, in particular the border between chemistry, biology and environmental chemistry and to establish quality research programs in the priority areas that will compliment the existing programs relevant for chemical environmental studies.

Package 3: *Internalisation of teaching and training* consists of advanced courses run by international scholars aimed at broadening the teaching offer of the graduate school, support for creation of new educational/course materials, complementary support for international students and teachers at the faculty in the form of stipends and fellowships. The objectives of Package 4 are to promote quality teaching through active participation of international teachers, and to increase the international awareness of students through direct contacts with international students and academics.

Package 4: *Reaching-out to local communities* consists of undergraduate courses run by visiting international teachers in neighbouring centres: Śrem, Kościan, and undergraduate information workshops for potential EU and Polish partners, presenting the potential and expectation of the local communities. The objectives of Package 4 are to promote quality teaching in local centers through active participation of international teachers, to increase international awareness of students through direct contacts with international academics, and to identify potential EU partners for networking and twinning arrangements for the local communities.

Package 5: *Coordinating the CHENVIR project* provides coordination of the project, assistance/help to visitors, and preparation/processing of information materials.

We are convinced that the establishment of a Centre of Excellence at the faculty will shape the future of environmental studies at the faculty. This will happen through close cooperation with our Polish and international partners. The Centre will provide an invaluable incentive for the further development of the Faculty of Chemistry at Adam Mickiewicz University.