

---

# UICEE: a Powerhouse for Engineering Education\*

**Zenon J. Pudlowski**

**Peter LeP. Darvall**

*UNESCO International Centre for Engineering Education (UICEE)*

*Faculty of Engineering, Monash University, Clayton, Melbourne, VIC 3800, Australia*

---

The UNESCO International Centre for Engineering Education (UICEE) is a unique development in the world and sees itself as having a basic role to play both in Australia and worldwide. It is determined to work in cooperation with other Australian and international schools and academics. The paper gives a comprehensive overview of the UICEE's role, activities and achievements as an international focal point in engineering education. It presents the aims and objectives of the Centre, its membership, established links with other institutions and the relevance to developing countries, and demonstrates some of the activities and achievements carried out in recent years. Some major undertakings in research and development such as the UICEE Urban Design and Education Programme (UDEP), the Graduate Courses in Engineering Education (GCEE), and the development of satellite centres in various regions of the world are presented and discussed in the paper.

---

## THE UICEE

The UNESCO International Centre for Engineering Education (UICEE) was established in the Faculty of Engineering at Monash University, Clayton, Melbourne, Australia. It commenced its operation on 1 January 1994. Prof. Peter LePoer Darvall, Deputy Vice-Chancellor at Monash University, is the Chairman of the Academic Advisory Committee, and Prof. Zenon Jan Pudlowski is the Director of the Centre.

## Mission

The mission of the UICEE is to facilitate the transfer of information, expertise and research on engineering education, and to act as a clearinghouse for the transfer of information on textbooks, engineering teaching courseware, software and equipment, in particular from developed to developing countries.

In its focus on engineering education, the Centre endeavours to realise UNESCO's *raison d'être*:

*...to contribute to peace and security by  
promoting collaboration among nations*

*through education, science and culture in  
order to further universal respect for  
justice, for the rule of law and for the  
human rights and fundamental freedoms  
which are affirmed for the peoples of the  
world, without distinction of race, sex,  
language or religion, by the Charter of the  
United Nations.*

The Centre operates to serve the international engineering education community by carrying out research and development activities, and by providing expertise in, and improving the quality of, engineering education (curricula and teaching methodologies) to better meet the needs of academia and industry.

## Principal Objectives

In its commitment to cultivating the knowledge and skills essential for high quality engineering education, the UICEE has pursued a number of objectives, the most significant of which are to:

- Conduct research into the methodology of teaching and learning processes, and assess the effectiveness of teaching programmes and programmes designed for developing technologies.
- Carry out research on equipment, textbooks, courseware and software utilised in engineering

---

\*A revised and expanded version of an opening address presented at the 2<sup>nd</sup> Global Congress on Engineering Education, held at Hochschule Wismar, Wismar, Germany, from 2 to 7 July 2000.

education, and to encourage further research in these areas.

- Promote collaboration in the field of engineering education between institutions in developed and developing countries.
- Collect and transfer information on advances in engineering education and develop modern techniques for the dissemination of this knowledge.

## UICEE MEMBERSHIP

The UICEE has evolved considerably over the last few years and in 1997, the UICEE decided to open the Centre to institutions and individual academics and to attract members to its five membership grades. The grades are Partner, Sponsor, Supporter, Contributing and Individual Member. A successful membership drive was carried out, and special effort was made to attract institutional members from developing countries and countries in social, economic and political transition, as these members could particularly benefit from the range of activities that the UICEE has to offer [1][2].

Membership has continued to climb steadily over the last three years and more individuals and organisations have been attracted to the UICEE and its cause of developing a global network in engineering education. The present membership of the UICEE includes:

- Partners (5)
- Sponsor (1)
- Supporter Members (11)
- Contributing Members (21)
- Individual Members (over 120)

## UICEE Partners

Altogether, six partnership arrangements have been instituted over the last three years with the following industrial and academic institutions:

- Roads Corporation, Victoria (VicRoads), Melbourne, Victoria, Australia
- Glasgow Caledonian University, Glasgow, Scotland, United Kingdom
- Ryerson Polytechnic University, Toronto, Ontario, Canada
- Technical University of Denmark, Kgs. Lyngby, Copenhagen, Denmark
- Chalmers University of Technology, Göteborg, Sweden
- Anna University, Chennai, Madras, India

It has to be reported, with regret, that the UICEE lost the Road Corporation, Victoria (VicRoads) as its Partner in 1999. The economic downturn in South East

Asia was the reason for VicRoads to scale down their international activities, and ultimately we pay the price of losing the only valuable industrial partner.

These new partnerships will enrich the so-called *UICEE Family of Engineering Educators*, and will strengthen the entire UICEE network of collaborators.

## UICEE SATELLITE CENTRES

The UICEE has instituted several satellite centres. The first was established in 1998 and the further expansion of these satellite centres continues. It is anticipated that these additional centres will contribute significantly to international cooperation in engineering education.

### Caledonian Centre for Engineering Education

The *Caledonian Centre for Engineering Education* (CCEE), a satellite centre of the UICEE, was established in the Faculty of Science and Technology at Glasgow Caledonian University, Glasgow, Scotland, in September 1998. The CCEE has recently expanded the range of its activities. These now include: designing, implementing and delivering programmes of study in the workplace at undergraduate and postgraduate levels, and has stimulated the involvement of other Departments within the Faculty of Science and Technology in their area of academic endeavours [3].

The idea of work based learning as a service to industry has gained considerable momentum in the United Kingdom, with Glasgow Caledonian University being the key player. In particular, both Prof. Colin U. Chisholm, Dean of the Faculty of Science and Technology, has developed a Postgraduate Learning Centre Framework based on workplace learning.

The whole concept of workplace learning has also attracted a lot of attention at UICEE-organised conferences. This is so much so that a paper co-authored by these two academics titled *Quality Assurance Issues Relating to the Delivery of Work Based Learning Programmes* received one of the two Diamond awards (first grade) for the Best Paper presented at the recent 3<sup>rd</sup> UICEE Annual Conference on Engineering Education, held in Hobart, Australia, in February 2000.

Also, the CCEE held its 1<sup>st</sup> Conference on Life Long Learning for Engineers at Glasgow Caledonian University, Glasgow, Scotland, between 22 and 25 May 1999, in collaboration with the UICEE. A Special Edition of the *Global Journal of Engineering Education* (GJEE) published selected papers presented at the Conference in Vol.3, No.3.

## Ryerson Centre for Engineering Education

The *Ryerson Centre for Engineering Education* (RCEE) has been established at Ryerson Polytechnic University in Toronto, Ontario, Canada, as a North American satellite centre of the UICEE in accordance with a Memorandum of Agreement on partnership signed by Professor Derek O. Northwood, Dean of the Faculty of Engineering and Applied Science, Ryerson Polytechnic University, on 30 July 1999.

A proposal for the development of the RCEE was presented by Prof. Derek O. Northwood and Prof. William E. White (former Dean) of the Faculty of Engineering and Applied Science at Ryerson Polytechnic University at the 3<sup>rd</sup> UICEE Annual Meeting held during the recent Annual Conference in Hobart [4]. The Centre was officially launched in June 2000 with Professor W.E. White as its Foundation Director.

The objective of the RCEE is to provide a focus for the development of academic and research-related activities in engineering education across North America, and where more appropriate, to work within the UICEE to advance the globalisation of engineering education. It is envisaged that particular emphasis in the work of the Centre will be placed on research development and the application of multimedia in engineering education.

## Centre for Engineering Educational Development

The *Centre for Engineering Educational Development* (CDM) at the Technical University of Denmark, Kgs. Lyngby, Denmark, has become a satellite centre of the UICEE in accordance with a Memorandum of Agreement on partnership signed on 1 September 1999 by Prof. Hans Peter Jensen, Rector of the University.

Prof. Palle Sørensen heads this Centre and particular emphasis in the work of the Centre will be placed on research into the methodology of engineering education.

## South Asia Centre for Engineering Education

A *South Asia Centre for Engineering Education* (SACEE) has been established at Anna University in Chennai, Madras, India, as a satellite centre of the UICEE under the leadership of the Vice-Chancellor of Anna University, Prof. Adinarayana Kalanidhi.

It is envisaged that this Centre will provide a focus for academic and research activities related to the

work on teaching methodologies in developing countries. In particular, special effort will be made to develop teaching methodologies for education in the establishment of small to medium sized enterprises that are so vital for economies in developing countries.

## INTERNATIONAL CONTACTS

The UICEE continues to vigorously pursue collaboration on academic and research related activities with academic organisations on an international basis so as to build a worldwide network of education institutions interested in developing engineering education.

One of the great strengths of the UICEE is its wide-ranging international network of contacts. The UICEE has established contacts with academic institutions and individual academics in over 180 countries in all corners of the world, with particular emphasis on the Asia-Pacific region, and Central and Eastern Europe.

A comprehensive database has been built and is being continuously expanded, consisting of academics and industry leaders especially interested in engineering education.

## International Network of Cooperation

Many more *Memoranda of Understanding* (MoU) were signed between the UICEE and international academic organisations in 1999, taking the total number of such agreements to 20. These cooperative agreements provide a basis for long-standing and fruitful collaboration in a broad range of engineering education research and development activities, and target the creation of an international network of education institutions involved in engineering education.

Collaboration involves, but is not limited to:

- Training programmes, both degree and non-degree.
- Research collaboration in areas of mutual interest to both parties, particularly with software development for engineering education.
- Exchange of academic materials that are made available to both organisations plus other sources, such as computer-based and printed materials, when available, to be included in the exchange.
- Exchange of scholars in the course of academic development.
- Sponsorship of cooperative seminars, workshops and other meetings on matters of mutual interest.
- Establishment of a number of regional groups (sub-centres) for engineering education, linked with the UICEE.

## New Initiative in India

A Memorandum of Understanding (MoU) was signed between the UICEE Director and Professor M.A. Mariasingam on the establishment of a private institute of technology, the International Institute of Technology (ININ-TECH), in Bangalore, India. Prof. Mariasingam is the Institute's Director-designate and founder.

As well as supporting the development of educational infrastructure in India, the UICEE's interest in this initiative is fuelled by the growth of commercial and private universities around the world, a phenomenon that requires investigation. Thus, the Centre sees its involvement in this project as both supportive and in terms of a case-study, investigating the effectiveness of such new models of higher education and how best they can serve the international community.

Initially, the Institute will offer associate degrees through education in the first two years of an undergraduate programme. In the early stages, the focus will be on electronics and computer engineering, areas that are so vital for the further development of Indian industry. Students will have the opportunity to continue their studies to achieve the degrees of Bachelor of Science or Bachelor of Engineering at universities outside of India.

## APHEN-EE Sub-Network

The UICEE has established a UNITWIN sub-network for engineering education in order to strengthen the exchange and transfer of information on new developments within this field. The *Asia-Pacific Higher Education Network Engineering Education* (APHEN-EE) presently has over 500 local and overseas contacts.

The UICEE has established a series of conferences called the *Asia-Pacific Forum on Engineering and Technology Education*. Two meetings have already been staged. The first was held at Monash University, Melbourne, Australia, in July 1997 and the second was held at The University of Sydney, Sydney, Australia, in July 1999. It is planned that the third Asia-Pacific Forum will be organised in a country of the South East Asian region for 2001.

Altogether, the two Forums attracted close to 200 participants from over 20 countries and produced two volumes of Proceedings with 155 excellent papers.

## Academic Visitors

A *UICEE Academic Visitors Seminar Series* has been established with the aim of promoting the transfer of

information from overseas countries to the host Faculty and to other academics in the Melbourne metropolitan area. The Seminars provide an excellent opportunity for sharing information with outstanding international and Australian academics.

The series provides local academics with the opportunity to learn about other Australian and international developments in engineering education and to discuss issues of importance with other academics. Many Australian and international academic and industry visitors have spent time in the Centre. Visitors were briefed on the role, status and academic activities of the Centre. Over 40 seminars were conducted during the period of 1994-2000, with over 20 distinguished visiting engineering scholars giving lectures under this series.

The most recent seminars were given by Prof. Eleanor Baum, Dean of Engineering at the Cooper Union for the Advancement of Science and Art, New York, and Dr Marshall M. Lih, a Senior Adviser in the Engineering Directorate at the US National Science Foundation. The first delivered a seminar titled *ABET 2000 Criteria*. The seminar presented the results of discussions held recently in the USA between engineering educators and industry personnel, concerning the attributes required by professional engineers in the new millennium. It is perceived that the introduction of these criteria by the Accreditation Board for Engineering and Technology will have tremendous implications on the accreditation process globally.

The second visitor presented a seminar titled *Towards a more professional engineering academe*. Dr Lih reinforced the UICEE's view that rapid development in technology and cognitive sciences, profound changes in industrial needs and student characteristics, and increasing complexity in managing material and human resources make it highly desirable that we provide formal education, training, and/or experience to engineering faculty and leaders. This should be in the following areas in addition to possessing strong technical knowledge, intellectual and research backgrounds: education pedagogy and use of information/multimedia technology; real-life industrial experience; and interpersonal, management, and leadership skills.

## PROFESSIONAL SOCIETIES WITHIN THE UICEE

Established in 1989 and comprising over fifty outstanding international figures actively involved in engineering education and industrial training, the International Liaison Group for Engineering Education (ILG-EE) is an independent working group that promotes inter-

national activities in the field of engineering education. It is registered as a charity organisation in the United Kingdom [5]. The main objectives of the ILG-EE are to:

- Promote the exchange of information and facilitate scientific cooperation in programmes of common interest between institutions.
- Propose and coordinate the organisation of meetings in the field, in particular international conferences and workshops.
- Identify problems of practical interest, and stimulate research and development efforts.
- Assist members and sponsoring organisations in carrying out activities relevant to their programmes.
- Serve as a means of disseminating information on progress to members and member countries and other organisations.

The ILG-EE has its Secretariat in the UICEE, with the UICEE Chairman as the ILG-EE Chairman, and the UICEE Director as its Foundation Secretary. The UICEE Chairman and the Director are both trustees of the ILG-EE. Since its inception, the Centre has been organising the Annual General Meeting of the ILG-EE in conjunction with its conferences.

## **RESEARCH PROGRAMMES AND DEVELOPMENT ACTIVITIES**

The UICEE has always vigorously pursued research and development activities for the benefit of the host Faculty, as well as the national and international engineering education communities. Many local and international engineering academics and industry staff are strongly involved in the activities of the Centre. The scarcity of financial resources is the only serious impediment to the rapid expansion of the UICEE.

In its commitment to cultivating the knowledge and skills essential for high quality engineering education worldwide, the UICEE continues to expand its research and development base, with new projects being instituted.

### **Research Programmes and Activities**

Over the last few years, the Centre has carried out several research and development projects of national and international significance, including the following:

- Research into the nature and effectiveness of international engineering curricula and the development of a global engineering education curriculum.
- A survey of industry views on important issues concerning engineering education and industrial training.

- Electronic publishing.
- The development of a global electronic database of research activities and academics involved in research into engineering education.
- The investigation of the status and quality of environmental engineering education and the inclusion of environmental issues and topics in general engineering education.
- A UICEE Urban Design and Education Programme (UICEE/UDEP).
- Research and development of Graduate Courses in Engineering Education (GCEE).

### **Urban Design and Education Programme (UDEP)**

The Urban Design and Education Programme (UDEP), a joint initiative of the UICEE and the Department of Infrastructure of the Victorian State Government, was officially launched at Monash University on 1 June 1999. The UICEE's interest in the project can be seen as an extension of its involvement in sustainable development and environmental engineering education. Moreover, it is expected that the project will make a valuable contribution to the achievement of sustainable urban development in the state and beyond.

UDEP's objective is to serve the international urban design profession by undertaking research, providing expertise in, and improving the quality of urban design education and practice, thereby promoting a sustainable approach to urban design. The programme will be realised through a number of activities, including research, the running of courses, staging of public and professional forums and the production of publications.

It is anticipated that the project will be a catalyst for change and will help to achieve a balanced approach to development. Therefore, the aim of the project is to establish urban design standards, to promote better procedures and world's best practice, and to act as a source of independent advice for governments and the community. With an impressive track record in quality urban design already, it is anticipated that the project will further strengthen Victoria's leading position in this field, both nationally and internationally.

All these objectives are being realised through a range of projects, which are being vigorously pursued by the UICEE/UDEP for the benefit of the local and global communities. The projects include:

- Design assessment criteria and methods for performance oriented planning.
- Design mediation process for Victoria.

- Development of urban design tools.
- Design, development and implementation of Urban design training courses.
- International Urban Design Fellowship Programme.

The most recent undertaking has been the design and development of a day-long short course called *Leading by Design – Managing for Better Urban Environments*. The course has been offered to councillors and executives of Local Councils in Victoria. Other exciting projects, such as *Urban Design Studios* supported by international urban design leaders, and research into international best practice, are well underway.

### Graduate Courses in Engineering Education

At the request of the then UNESCO's International Committee on Engineering Education (ICEE), the UICEE developed and implemented a range of graduate courses in engineering education with the objective of facilitating academic teaching staff development.

Concerned with the level of preparedness of engineering academic staff to teach the discipline, the UICEE Director first became involved, with the objectives of this project, many years ago when teaching at The University of Sydney in 1988, although his interest in the area goes back considerably further. He proposed a range of courses in engineering pedagogy and education to be implemented concurrently with undergraduate engineering and technology programmes but the plan met with little interest in the engineering establishment at the time. Many universities are now trying to establish and implement staff development programmes in engineering education, and so it was with some delight that he took up the opportunity to revive this project.

The concept of the university as a research organisation has created a situation in which universities are the only education establishments that allow their teaching personnel to undertake educational activities without any formal teaching qualification and preparation. It is unthinkable that other professions would permit unqualified individuals to practice.

The need for such courses has been long recognised by those involved in engineering education, and has been brought about by the recent influx of new technologies, particularly multimedia and the Internet. Yet there is a total lack of preparation of graduate engineers aiming at a career in education and training. Relevant managers and leaders have grossly neglected this issue. It is believed that the introduction of such courses would remedy the present critical situation.

The objective of these courses is to provide the many professional engineers who are involved with engineering education and industrial training with an important additional qualification. A range of options will be available to academics and professional engineers for understanding and solving many educational and training issues.

In July 1999, an invitation was circulated globally via the Internet to individuals and faculties to participate in the development of Graduate Courses in Engineering Education by offering their expertise and keenness to develop multimedia teaching materials for a subject, or part of a subject within the courses [6].

A two-day workshop concerning the programmes was held between 7 and 8 February 2000, immediately prior to the 3<sup>rd</sup> UICEE Annual Conference on Engineering Education at the University of Tasmania, Hobart, Tasmania, Australia, with over 30 international academics attending. The interest shown in the project and in attendance at the workshop and Conference has been remarkable.

At this point, the first two stages have been accomplished, with the design of the three individual courses and the set of concise subject syllabi. Workshop participants discussed the course structure and the subject syllabi. Developers of individual subjects were identified and then each group commenced the development of a set of extended subject syllabi, which will include of methodological units within each subject. These individual methodological units will consist of: the unit content, educational goals, methods of realisation, recommended sources of information for additional studies such as references, hypertext links, etc. Work has continued in the development of this, with the next workshop held in conjunction with the 2<sup>nd</sup> Global Congress on Engineering Education. Further seminars will be held in order to advance the project in the near future.

It is envisaged that the courses will be offered externally using the Internet. It is intended that the teaching materials will facilitate self-study and be as interactive, and with as wide a range of examples, as possible.

### Joint Supervision of Postgraduate Projects

The UICEE-CCEE relationship has been rapidly strengthened through several areas of academic endeavour. One of the immediate opportunities for collaboration was the joint supervision of postgraduate students, with one academic from the candidate's university, one from the Glasgow Caledonian University (GCU) and the UICEE Director to form the supervision team.

The GCU instituted several modes of postgraduate education that could be undertaken on an external basis. Such programmes included the Postgraduate Learning Contract (PLC) framework, through which working students could achieve a Master of Science degree through a work-based learning/research programme. A new development is the possibility of undertaking a Doctorate in Professional Practice through the same work-based PLC.

Professor Colin Chisholm, Dean of the Faculty of Science and Technology, championed the programme at GCU that would allow for the joint supervision of research and development projects between the UICEE and GCU. Two potential candidates for this programme, one from Germany and the other from Canada, have been identified and are likely to commence their projects soon.

A critical issue will definitely be the high tuition fees in the UK. At this stage, these fees may have prevented potential candidates from developing countries, and countries in political, economic and social transition from taking advantage of this excellent opportunity. However, if this initiative finds a good response from developing countries, both organisations will look for potential sponsors to lessen the financial burden for candidates from these countries.

### Women in Engineering Education Scheme

Recognising the under-representation of women on academic staff of engineering faculties worldwide, and seeking to facilitate research and development activities, the UICEE established a scholarship scheme: the *UICEE Women in Engineering Education Scholarship*. Scholarships are offered for research in engineering education leading to the award of the degree of Master of Engineering Science by research with the possibility of continuing exceptional projects to the award of the degree of Doctor of Philosophy.

Particular emphasis is placed on research into human aspects of engineering, engineering pedagogy, training methodologies in engineering, educational technology, multimedia and computer-aided engineering education.

Two scholarships have so far been offered under this scheme. One scholarship was continued in 2000 to support postgraduate research projects leading to the award of a Master of Engineering Science (Research), with the candidate undertaking an investigation of environmental engineering issues and sustainable development.

### Research Publications

The Centre's staff and students pay particular attention to publishing their scholarly work and achievements. In the period of 1994-1999, staff and students of the Centre authored or co-authored a large number of research publications. Table 1 shows the UICEE's research publications, including the Research Quantum score, which is one of the measures used by Australian academia in the assessment of research output.

### Research and Development Grants

During the entire period of its operation, the UICEE has concentrated its effort on the expansion of its research and development activities. Numerous grant applications for financial support to facilitate research and development activities were prepared to various funding bodies and agencies in 1994-1999. Membership fees and external earnings have also been used for this purpose. Table 2 shows the level of earnings of the UICEE in the period 1994-1999.

The UICEE was able to raise in total about \$A1,343,000, which is an enormous effort and demonstrates the success of a small centre operating in difficult economic conditions.

Table 1: UICEE's research publications in the period of 1994-1999.

	Books	Book Chapter	Publication as Editor	Journal Papers	Conference Papers	Major Reports	Research Quantum Points
1994			2	8	12	2	16.07
1995		8	5	4	13	2	21.13
1996		2	5	4	14	1	17.05
1997	1		2	7	9	2	15.70
1998			4	6	19	1	20.40
1999			4	6	14	1	18.66
Total:	1	10	22	35	81	9	109.01

Table 2: UICEE Revenue.

Year	Revenue (\$A)
1994	118,000
1995	200,000
1996	170,000
1997	225,000
1998	200,000
1999	430,000
Total:	1,343,000

## LOCAL AND INTERNATIONAL CONFERENCES

Since its inception, the UICEE has been involved in organising local and international conferences and meetings on engineering education in almost every corner of the world.

In recognition that international cooperative networks and programmes are most effectively developed through direct contact between individuals, the UICEE has undertaken to co-ordinate, promote and support various national and international conferences and meetings.

Apart from the organisation of some one-off conferences, the UICEE has developed four significant series of conferences, namely:

- *Global Congress on Engineering Education* (Cracow - 1998, Wismar - 2000)
- *UICEE Annual Conference on Engineering Education* (Melbourne - 1998, Auckland - 1999, Hobart - 2000).
- *Asia-Pacific Forum on Engineering and Technology Education* (Melbourne - 1997, Sydney - 1999).
- *Baltic Region Seminar on Engineering Education* (Vilnius - 1997, Riga - 1998, Göteborg - 1999, Copenhagen - 2000)

The paramount objectives of this activity are to raise the national and international profile of the UICEE as an organisation fully committed to the progress of engineering education, and to create an opportunity for the exchange of information on engineering education, and also to initiate cooperative projects.

## COMMUNICATIONS

The UICEE places particular emphasis on the international dissemination of information. In the period of 1994-1999, the Centre published a large number of publications, including books, proceedings, journals, brochures, etc, in hard copy and electronically, which were subsequently distributed throughout the world.

## UICEE Newsletter

The UICEE established its own *UICEE Newsletter* not long after it commenced its operation in 1994. Currently, the Newsletter consists of three issues per annum, released in March, July and November.

The UICEE Newsletter is being distributed to the members on the relevant databases, as well as to the national Commissions for UNESCO in over 190 countries. This distribution occurs in hard copy, as well as via the Internet.

## Global Journal of Engineering Education

In 1997, the UICEE established its own internationally focused engineering education journal, appropriately titled the *Global Journal of Engineering Education* (GJEE), an exciting development for the UICEE in its role as a clearinghouse of innovation in engineering education.

It is a further step in the Centre's quest to fulfil its commission of human resources development within engineering through engineering education, in this instance by providing both a global forum for debate on, and research and development into, issues of importance to engineering education, and a vehicle for the global transfer of such discourse. So far, the GJEE has published three volumes with nine issues. These annual volumes included:

- Volume 1 (1997) - 48 papers with 346 pages
- Volume 2 (1998) - 48 papers with 326 pages
- Volume 3 (1999) - 42 papers with 314 pages

The GJEE is available to members of the UICEE in hardcopy and, along with other UICEE publications, on the Internet [7]. It should be noted that while the journal is fully available on the Internet, there is a delay of one issue so as to advantage subscribers.

## Monash Engineering Education Series

The *Monash Engineering Education Series* was established by the UICEE in 1995 in its ongoing mission to undertake research and development in, and to act as a clearinghouse for information on engineering and technology education. The series, which is for all academics involved in engineering education research, has opened up tremendous opportunities for engineering educators to share their achievements with local and international colleagues. It has added a further dimension to international engineering education by creating a source of information on research and development activities in engineering and technology education.



The establishment of the UICEE's publishing programme began a new stage in the activities of the UICEE. The following works have been published in this Series:

- *Computers in Electrical Engineering Education Research, Development and Application* (1995).
- *Proceedings of the 1995 International Congress of Engineering Deans and Industry Leaders* (1995).
- *The Application of Computer-Assisted Training Programs in Engineering Education* (1996).
- *Proceedings of the 1<sup>st</sup> Asia-Pacific Forum on Engineering and Technology Education* (1997).
- *ALLTED - A Computer-Aided Engineering System for Electronic Circuit Design* (1997).
- *Proceedings of the 1<sup>st</sup> UICEE Annual Conference on Engineering Education* (1998).
- *Proceedings of the 2<sup>nd</sup> Baltic Region Seminar on Engineering Education* (1998).
- *Proceedings of the 2<sup>nd</sup> UICEE Annual Conference on Engineering Education* (1999).
- *Proceedings of the 2<sup>nd</sup> Asia-Pacific Forum on Engineering and Technology Education* (1999).
- *Proceedings of the 3<sup>rd</sup> Baltic Region Seminar on Engineering Education* (1999).
- *Proceedings of the 3<sup>rd</sup> UICEE Annual Conference on Engineering Education* (2000).
- *Proceedings of the 4<sup>th</sup> Baltic Region Seminar on Engineering Education* (2000).

The UICEE takes special care that all its publications are being indexed by the Institute of Scientific Information (ISI) based in Philadelphia, Pennsylvania, USA. The ISI is committed to providing comprehensive coverage of the world's most important publications and retrospective information retrieval.

### Electronic Communication

Electronic communication using the Internet is a new and extremely powerful medium, and several initiatives involving the use of the electronic medium were instigated and undertaken by the UICEE since 1996. The UICEE was awarded a number of grants for research into the development of an electronic scholarly publishing capability within a university environment and to develop the techniques and skills for publishing scholarly material on the Internet.

### Electronic Mailing Lists

To facilitate the transfer of information throughout the national and international communities, the UICEE established several electronic mailing lists. However, due to the low level of interest in this method of communication, the UICEE reduced the number of mailing lists to incorporate the Centre's Newsletter, and the Asia-Pacific Higher Education sub-Network on Engineering Education (APHEN-EE).

Also, several electronic databases have been set up by the UICEE to facilitate membership matters. One such database is the electronic UICEE Membership List. All members are being encouraged to supply the UICEE, via e-mail, their short biographies and photographs that are then included in the database on the Internet.

### Homepage on the World Wide Web

The UICEE has long established its own Homepage on the Internet, which presents the wide range of activities as well as UICEE publications. An excellent way of introducing other engineering educators to the Centre and its work is to broadcast the Centre's Internet address.

Since its inception, the Homepage has attracted over 12,000 visitors, and the number of visits to the site is steadily increasing. The UICEE has also encouraged feedback regarding the usefulness of information provided in the site.

The web-site can be accessed using any of the World Wide Web browsers, such as Netscape or Mosaic, at: <http://www.eng.monash.edu.au/uicee/>

### CONCLUSIONS

The UICEE has proved itself to be an important initiative of Monash University and UNESCO, as the globalisation of engineering education requires a champion and a focal point for engineering and technology education at a tertiary level.

The Centre has developed itself as a global hub required to carry out and coordinate research and development activities as the global engineering community needs a clearing house for the transfer of information on engineering education research and development from developed to developing nations.

It is demonstrated in the paper that the UICEE has largely fulfilled its role and objectives as a global centre. In the international arena, the UICEE has

established links with other universities and professional bodies, hosted international visitors, organised a number of international conferences and meetings, conducted training courses and distributed its publications in the field of engineering education to institutions overseas.

The importance of UICEE activities in the process of training of personnel involved in teaching, and the advancement of research into, and development of, engineering education and industrial training of engineers is demonstrated through the UICEE's effort to develop a range of graduate courses in engineering education.

The Centre has vigorously pursued its research, development and publication activities, has established a global network of institutions and organisations involved in engineering education, and developed a number of groups and its satellite centres in several regions of the world.

Moreover, the UICEE is a unique development in the world and sees itself as having an important role to play locally and globally and is determined to work in cooperation with its Partner Institutions, other Australian and international engineering schools and academics for the benefit of the global engineering community.

## REFERENCES

1. Pudlowski, Z.J. and Darvall, P.LeP., USICEE - a path-finding enterprise in the globalisation of engineering education. *Global J. of Engng. Educ.*, 1, 1, 49-59 (1997).
2. Pudlowski, Z.J. and Darvall, P.LeP., UICEE: world leader and focal point in engineering education, research, development and information transfer. *Proc. Global Congress on Engineering Education*, 17-21 (1998).
3. Caledonian Centre for Engineering Education (CCEE), <http://www.fst.gcal.ac.uk/ccee/homeccee.html>
4. Northwood, D.O. and White, W.E, Proposal for the development of a Ryerson Centre for Engineering Education (RCEE) (2000).
5. International Liaison Group for Engineering Education (ILG-EE), <http://www.eng.monash.edu.au/uicee/ilgee/ilgee.html>
6. Graduate Courses in Engineering Education, <http://www.eng.monash.edu.au/uicee/activity/gcee.html>
7. *Global Journal of Engineering Education*, <http://www.eng.monash.edu.au/uicee/gjee/globalj.htm>

## BIOGRAPHIES



Zenon Jan Pudlowski graduated Master of Electrical Engineering from the Academy of Mining and Metallurgy (Cracow, Poland), and Doctor of Philosophy from Jagiellonian University (Cracow), in 1968 and 1979 respectively. From 1969 to 1976, he was a lecturer in the Institute of Technology

within the University of Pedagogy (Cracow). Between 1976 and 1979, he was a researcher at the Institute of Vocational Education (Warsaw), and from 1979 to 1981, was an Adjunct Professor at the Institute of Pedagogy within Jagiellonian University. From 1981 to 1993, he was with the Department of Electrical Engineering at The University of Sydney where, in recent years, he was a Senior Lecturer.

He is presently Professor and Director of the UNESCO International Centre for Engineering Education (UICEE) in the Faculty of Engineering at Monash University, Clayton, Melbourne, Australia. He was Associate Dean (Engineering Education) of the Faculty of Engineering between 1994 and 1998. His achievements to date have been published in books and manuals and in over 250 scientific papers, in refereed journals and conference proceedings.

In 1992, he was instrumental in establishing an International Faculty of Engineering at the Technical University of Lodz, Poland, of which he is the Foundation Dean and Professor (in absentia) (1992-1999). He was also appointed Honorary Dean of the English Engineering Faculty at the Donetsk State Technical University (DonSTU) in the Ukraine in 1995.

Professor Pudlowski is a Fellow of the Institution of Engineers, Australia. He is a member of the editorial advisory boards of many international journals. He was the 1<sup>st</sup> Vice-President and Executive Director of the AAEE and the Editor-in-Chief of the AJEE since its inception in 1989 until 1997. Currently he is the Editor-in-Chief of the *Global Journal of Engineering Education*, and is the Foundation Secretary of the International Liaison Group for Engineering Education (ILG-EE).

Professor Pudlowski has chaired and organised several international conferences and meetings. He received the inaugural AAEE Medal for Distinguished Contributions to Engineering Education (Australasia) in 1991 and was awarded the Order of the Egyptian Syndicate of Engineers for *Contributions to the Development of Engineering*

*Education on both National and International Levels* in 1994.

In June 1996, Professor Pudlowski received an honorary doctorate from the Donetsk State Technical University in the Ukraine in recognition of his contributions to international engineering education, and in July 1998 he was awarded an honorary Doctorate of Technology from Glasgow Caledonian University, Glasgow, Scotland, United Kingdom. In 1997, he was elected a member of the Ukrainian Academy of Engineering Sciences.



Peter LePoer Darvall is currently Professor and the Deputy Vice-Chancellor (Research & Development) of Monash University, and was previously the Dean of Engineering at Monash University between 1988 and 1994. He graduated in Engineering from the University of Melbourne in 1963 and

gained higher degrees at Ohio State University and Princeton University and a DipEd at Monash University.

He joined Monash as a Lecturer in Civil Engineering in 1970 after experience with Maunsell and Partners, with Freeman, Fox and Partners, as a surveyor for a glaciological expedition in Alaska, and as Site Engineer for an archaeological expedition in Egypt. He has held visiting appointments at UNAM in Mexico, the University of California at Berkeley and the University of Wisconsin. He has authored and co-authored books on mechanics and structures, and reinforced and prestressed concrete. His many research papers have covered a variety of areas, but in recent years he has concentrated on softening in concrete structures and high strength concrete and engineering education.

Prof. Darvall was for many years a member of the Monash University Council and was National President of the Federation of Australian University Staff Associations (FAUSA) (1979–1981) and was President of the Australasian Association for Engineering Education (AAEE) between 1991 and 1995. Prof. Darvall is currently Chairman and a Trustee of the International Liaison Group for Engineering Education (ILG-EE) and Chairman of the UICEE Academic Advisory Committee.

## **The Global Journal of Engineering Education**

The UICEE's *Global Journal of Engineering Education* (GJEE) was launched by the Director-General of UNESCO, Dr Frederico Mayor at the April meeting of the UNESCO International Committee on Engineering Education (ICEE), held at UNESCO headquarters in Paris, France, in 1997.

The GJEE, which is set to become a benchmark for journals of engineering education, is edited by the UICEE Director, Prof. Zenon J. Pudlowski, and has an impressive advisory board, comprising close to 30 distinguished academics from around the world.

The Journal is a further step in the Centre's quest to fulfil its commission of human resources development within engineering through engineering education, in this instance, by providing both a global forum for debate on, and research and development into, issues of importance to engineering education, and a vehicle for the global transfer of such discourse.

In the first three years of the Journal's existence, 139 papers over 986 pages have been published, including award-winning papers from UICEE conferences held around the world. Papers have tackled issues of multimedia in engineering education, international collaboration, women in engineering education, curriculum development, the future of engineering education, the World Wide Web and the value of international experience, to name a few. Other examples include: Volume 3, Number 1 was a special issue dedicated to papers by members of the UNESCO *International Committee on Engineering Education* on quality issues in engineering education, while Volume 3, Number 3 focussed on papers given at the 1<sup>st</sup> Conference on Life-Long Learning for Engineers.

The GJEE is available to members of the UICEE at an individual member rate of \$A100 p.a., or to libraries at a rate of \$A200 p.a. (nominally two issues per year, although each volume has included an extra, complementary issue). For further details, contact the UICEE at: UICEE, Faculty of Engineering Monash University, Clayton, Victoria 3800, Australia. Tel: +61 3 990-54977 Fax: +61 3 990-51547, or visit the UICEE Website at:

<http://www.eng.monash.edu.au/uicee>