1. State of Clinical Engineering (CE) - Health Technology Management (HTM) – Body of Practice (BOP)

The Biomedical Clinical Association of Ireland (BEAI) was set up in 1992 in response to the demands of the growing number of engineers working on electromedical equipment in the public sector.

There are 172 clinical engineers in Ireland working within the health service. 70% of these are members of the BEAI and others have been throughout the years. Separate to the above statistic, it’s membership also includes industry corporations and individuals, and academia.

The BEAI is the only single dedicated constitutionally focused clinical engineering organisation in Ireland professionally representing public sector clinical engineers employed within the Irish healthcare system.

In the past year, it has completed an extensive Governance project, updating process and procedures in line with future best practice governance legislation for associations such as the BEAI.

It has also developed standard templates for CE programmes to facilitate programme development and standardise format, delivery and content.

The following sub-committees are long established and provide governance, operations, strategic professional development, education, publications, training and scientific functionalities:

a. Executive Committee – Monthly meetings
b. Education, Training and Committee – Monthly meetings
c. Professional Development – Every 2 weeks, PD Workshops & Certification
d. Membership Development – BI Monthly Meetings
e. IT & Website – Bimonthly Meetings
f. Publication Committee – Responsible for publishing scientific journal – 3-4 per year. Spectrum
g. Scientific Development Committee – Annual Scientific Meeting’s etc.

The BEAI has been a member of IFMBE since 1996. It is actively participated in IFMBE CED activities. It has had a number of IFMBE president’s attendance annual scientific meetings for example Prof Nagel in 2006 and Prof KS in 2017. Other CED executive members have also attended and presented e.g. Tom Judd, Yadin David, James Wear, presented at our annual scientific meeting this year utilising Zoom technology. This

The BEAI are in the process of completing and analysing a workforce planning and professional development questionnaire that they designed and circulated to the profession within Ireland. So far 157 / 172 responses have been received from clinical engineers in the public healthcare sector - this participation level for a survey monkey survey is quite phenomenal. Preliminary results are enclosed for indicative purposes only as to the state of our profession. Once complete the results of the survey shall be published both nationally and internationally. [See accompanying attachment but please do not share yet as is work in progress].

Activity Examples:

• An Annual Scientific Programme, now in its 24th year which brings speakers and delegates from both the profession in hospitals and industry, both from home and internationally.
• We host regular Continuing Education Series, which provides up to date education briefings on a variety of issues from new devices, to new regulations.
• It provides an opportunity for both professionals, industry members and other allied health care professions to come together and learn from each other.
• Many of our continuing education series, are relevant for other health care professions in hospitals, which builds positive relationships and practices within hospital groups
• It participates at international conferences, representing and sharing experiences of the Irish profession.
• It is currently working on certification, following IFMBE and other certification guidelines.
2. How would you suggest to show the Value of and from having CE-HTM program?

A CE – HTM programme ought to have a successful output.

Develop a template for the categorisation of different components of the ”SUCCESS STORIES” programme collated from around the world. Any success story may be comprised of a series of standard elements. Categorise and isolate these elements and then you can benchmark the respective values of those success story elements.

For example, typical success story involving patients elements may be:

- quality of patient care,
- appropriate timeliness of patient care,
- outcome of patient care
- utilisation and optimisation of available resources
- ingenuity
- fiscal constraints and availability
- sustainability of success track methodology
- translational components of success story
- status of impact – local national or international

etc

so CE HTM programs too would have a series of elements that could be classified

By breaking down success stories into categorise components mechanisms for determining value of each component, or assessing the key deterministic component, or components may be garnered.

The above may be a different way of examining features and determining’s values of having a CE – HTM programme. For if your health technology Management program is successful then it is success story and can be valued accordingly.

3. Example of success stories where CE supported patient outcomes?

Many hospitals based clinical engineers in Ireland apart from their core equipment management duties are considered members of the patient care giving multidisciplinary team. For example: in ICU clinical engineers will be consulted on the optimum mode of ventilation to support the critically ill patient. Similarly, so, in a dialysis unit they would be consulted on the optimum dialysate concentration makes and machine settings to affect best outcome for patient dialysis. In order to do this many have knowledge of human physiology and anatomy and biochemistry.

Clinical engineers in Ireland designed the technology to fit in the national air transport medevac helicopters used to deliver patients from around the country to acute hospital sent this. Especially with infant care they would become part of the transport and care team involved in medevac.

Several of our recent CE programmes are multi-disciplinary.

i. Ventilation Science & Technology had delegates from other impressions, which improved their understanding of the operational technology of ventilation machines – always improving the outcome for patients.

ii. Similarly, a CE programme on Decontamination was well attended by nurses and theatre technicians, dental assistants and members of the profession; all receiving up to date information on the regulation and best practices in decontamination – this sort of seminar works across the professions, focusing on better outcomes for patient care.
Clinical engineers involved in the national medical equipment procurement programme supply decommissioned equipment to African countries in need. In addition to supplying equipment, they would accompany the transport and spend a number of weeks setting up equipment and training local staff and the donated technology.

Away from the acute hospital setting technology management and the community was non-existent from a structured perspective. Over the past five – 10 years clinical engineers have been involved in the complete management of community area governance and operational systems implementation for community based medical devices. This is proven to be phenomenally successful and ensures faster and better technology with quicker turnaround and delivery times for home care patients.

In 2005 the Government of Ireland established the National Plan for Radiation Oncology (NPRO) to develop and expand the national network of radiation therapy facilities. The NPRO delivered 2 new interim Radiation Oncology Centres in Dublin on the campus of St. James’s and Beaumont Hospitals in 2010. These centres each had 4 Linear Accelerators, 2 CT Simulators and 1 MRI machine with other minor medical equipment also installed. This project was delivered on time and within budget and Clinical Engineering were part of the NPRO project team involved with the planning, specification, procurement, installation and commissioning of the new facilities and equipment. Following on from the success of this project a National Major Medical Equipment & Clinical ICT Procurement Group for Radiation Oncology was established and Clinical Engineering are represented on this group. This group were recently involved in the specification and procurement of 5 new Linear Accelerators, 2 xCT Simulators and treatment planning systems for Cork University Hospital which is housed in a new Radiation Oncology Facility due to start clinical treatments in November 2019.
Engineering Courses

In Ireland

with Clinical Engineering Content

Institutions in alphabetical order by location

The "Qualification" column indicates, in bold, the initial qualification awarded, together with follow-on opportunities, if any are available, and which may be in the same or a related discipline. Follow-on opportunities may also be available in another institution. You MUST consult the institution literature. CT = Certificate; FC = Foundation Certificate;

DP = Diploma; HC = Higher Certificate; DG = Ordinary Bachelor Degree; HD = Honours Bachelor Degree.
### CORK INSTITUTE OF TECHNOLOGY

<table>
<thead>
<tr>
<th>Code</th>
<th>Level</th>
<th>Qualification</th>
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</thead>
<tbody>
<tr>
<td>CR 520</td>
<td>Level 8</td>
<td>Biomedical Engineering</td>
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<table>
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<th>Qualification</th>
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<tbody>
<tr>
<td>CR 075</td>
<td>Level 7</td>
<td>Biomedical Engineering*</td>
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<tr>
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<th>Level</th>
<th>Qualification</th>
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</thead>
<tbody>
<tr>
<td>TR 032</td>
<td>Level 8</td>
<td>Engineering</td>
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### DUBLIN CITY UNIVERSITY

<table>
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<tbody>
<tr>
<td>DC 197</td>
<td>Level 8</td>
<td>Biomedical Engineering</td>
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### INSTITUTE OF TECHNOLOGY, TALLAGHT

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<tr>
<th>Code</th>
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<th>Qualification</th>
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<tbody>
<tr>
<td>TA 224</td>
<td>Level 8</td>
<td>Biomedical Design Engineering (notes: 1 + 2)</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title (NOT to be entered on Application Form) Ordinary Bachelor Degrees - Level 7</th>
<th>Qualification</th>
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<tbody>
<tr>
<td>TA 218</td>
<td>Biomedical Design Engineering (note: 1)</td>
<td>DG + HD</td>
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### TRINITY COLLEGE DUBLIN

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<tbody>
<tr>
<td>TR 032</td>
<td>Level 8</td>
<td>Engineering</td>
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</tbody>
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- Degree options: Biomedical, Civil Structural and Environmental, Computer, Electronic, Electronic/Computer (joint programme), Mechanical and Manufacturing.

### UNIVERSITY COLLEGE DUBLIN

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<th>Code</th>
<th>Level</th>
<th>Qualification</th>
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<tbody>
<tr>
<td>EN 150</td>
<td>Level 8</td>
<td>Engineering</td>
</tr>
</tbody>
</table>

- Common entry with degree options in:
  - Biomedical Engineering
  - Biosystems & Food Engineering
  - Chemical and Bioprocess Engineering
  - Civil Engineering
  - Civil, Structural & Environmental Engineering
  - Electronic & Computer Engineering
  - Electronic Engineering
  - Electrical Engineering
  - Electrical Energy Engineering
  - Engineering with Business
  - Energy Systems Engineering
  - Materials Science and Engineering
  - Mechanical Engineering
  - Structural Engineering with Architecture
### GALWAY-MAYO INSTITUTE OF TECHNOLOGY

<table>
<thead>
<tr>
<th>Code</th>
<th>Title (NOT to be entered on Application Form) Ordinary Bachelor Degrees - Level 7</th>
<th>Qualification</th>
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<tbody>
<tr>
<td>GA 684</td>
<td>Biomedical Engineering</td>
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</tr>
<tr>
<td>GA 684</td>
<td>Engineering (Common Entry to Agricultural, Biomedical, Energy and Mechanical Engineering)</td>
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### NATIONAL UNIVERSITY OF IRELAND, GALWAY

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<thead>
<tr>
<th>Code</th>
<th>Title (NOT to be entered on Application Form) Honours Bachelor Degrees - Level 8</th>
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<tr>
<td>GY 401</td>
<td>Engineering (Undenominated) in the Level</td>
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<tr>
<td></td>
<td>Degree Options: Biomedical, Civil, Electronic and Computer, Energy Systems Engineering, Electrical and Electronic Engineering, Mechanical, BSc Computer Science and Information Technology, BSc Project and Construction Management</td>
</tr>
<tr>
<td>GY 408</td>
<td>Biomedical Engineering</td>
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### UNIVERSITY OF LIMERICK

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<th>Code</th>
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<tbody>
<tr>
<td>LM 11a</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td>(Common entry with choice * to pursue defined Degree Options in any of the following: Biomedical Engineering, Mechanical Engineering; Civil Engineering; Design and Manufacture Engineering)</td>
</tr>
<tr>
<td></td>
<td>*Choice may be restricted subject to Degree Option capacities</td>
</tr>
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#### Non University Based

**BEAI**

In 2019 it has run 5 CE programmes to date and has two to run.

- 2019 calendar, Promotional Brochures, Course Programmes and Feedback Template
- 2019 Annual Scientific Programme
- Draft calendar for 2020
5. CE Association/Society and Credentialing/Certification program if available

BEAI’s Certification protocol is presently being developed. Whilst the BEAI has members from the public health service, industry, and academia, the certification protocol being developed is initially for those clinical engineers employed by the government in the public healthcare system.

The professional development committee of the BEAI has spent the past year developing a certification protocol that is in line with a number of requirements.

These requirements being:

- National regulatory requirements for health and social care professions in Ireland – CORU
- Irish public healthcare eligibility requirements for entry into the profession of clinical engineer
- IFMBE CED recommendations of the White Paper on certification; and IRB requirements

6. CE major challenges (think of 3 subjects)

a. Recognition of the clinical engineer within the healthcare system.

b. Develop certification;

c. Developing a national training scheme for clinical engineers at all grades

d. Continue to grow membership and build recognition of the profession through outreach

7. What is the most important action you will support to increase CE recognition?

The formal international recognition of the profession of clinical engineer by WHO professions registrar and other regulatory and/or enforcing global agencies.

“WE ARE WHO WE ARE”