Interview of Kelly Coverdale, Chair EA Biomedical College for Ashley, QLD-based high school student

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1. What are the career paths and potential employers in biomedical engineering?

    Career paths in Biomedical Engineering

    - Research & Teaching
      - Requires PhD pathway
      - E.g. Various clinical specialisations, engineering best practice specialisations, education
    - Product Development
      - E.g. Medical device manufacturing industry in design, assessment/testing, production, quality, regulatory, software development…
    - Clinical Engineering
      - E.g. Hospital-based asset management, Medical IT systems and cybersecurity, patient-matched 3-D printed devices…
    - Rehabilitation Engineering
      - E.g. Custom seating, robotics, prosthetics & orthosis, gait analysis, community support services (access & home solutions), assistive technologies…
    - Nanotechnology
      - PhD pathway currently
      - Specialist research
    - Regulatory & Compliance
      - TGA, notified bodies, NDIA/NDIS Commission
      - E.g. pre-market assessment, auditing, post-market monitoring, testing, compliance systems

    Potential employers of Biomedical Engineers

    - Hospitals/healthcare providers,
    - Universities
    - Research centres
    - Medical device manufacturers
    - Medical device manufacturing supply chain product and service providers
    - Regulators (TGA, NDIA/NDIS Commission, notified bodies)

2. What is a day in the life of a biomedical engineer?

    This can vary considerably dependent on the area of sub-specialty – the EA Biomedical College are in the process of drafting a guide for sector-based Biomedical Engineering functions that might help.

    In my own career:

- Advising on medical equipment purchasing (e.g. suitability to clinical need, whole of life cost analysis, supplier compliance),
- assessing risks and opportunities in alternative maintenance plans and non-OEM parts use in medical devices,
- drafting service and maintenance contracts for medical devices and systems – ensuring compliance with relevant standards, whole of life value,
- reviewing service reports to confirm compliance with contract,
- clinical incident investigations,
- recall management,
- awareness campaigns for clinical users of medical equipment to reduce user error
- working in multi-disciplinary teams across healthcare
- working with technicians in workshop where required
- working with other Biomedical Engineers to develop procedures for quality management system
- training

Product Development

- Research (e.g. existing similar technologies, clinical need, clinical state of the art, materials, structural functionality, anatomic and physiological interactions with implants…)
- Application of biomedical engineering principles to design an implant suitable to the anatomical, biological and clinical practice environment
- Development of documentation of design i.e. design requirements, design inputs, design outputs (specifications, drawings, manufacturing instructions, quality inspection instructions), verification and validation protocols and test reports, risk planning, analysis and reporting
- Development of quality management system procedures
- Medical device project leadership of a multi-disciplinary team (clinical, compliance, marketing, manufacturing, logistics)
- Participation in compliance audits for the organisation and/or specific product files
- Visit clinical environment to observe surgical cases relevant to the product being developed
- Training

3. How did you become your own business and what does it do?

I am passionate supporting the growth of the MedTech industry in Australia to provide opportunities for the current and emerging talent that we have in Biomedical Engineering. During my career I diversified my skill set by pursuing various roles within different sectors and gained an appreciation for the biomedical ecosystem that many biomedical engineers don't experience if they remain specialised in one area.

I founded Cover Biomedical when I saw a gap in the market to support medical device startups and scale ups with strategies and frameworks to considerably reduce risk during the early stages of their company, and as they take a product towards commercialisation. Especially as both of these activities are often occurring concurrently, with very little funding. I see this achieved through the development of knowledge, skills and capability of best practice in biomedical engineering design and risk management in the context of the relevant compliance frameworks.

The business also supports industry success in other ways i.e. development of compliance frameworks more broadly (relevant to medical devices), awareness of product development journey expectations for investors and start-ups preparing to fundraise, and leadership development for Biomedical Engineers or non-Biomedical Engineers overseeing a biomedical engineering function in medical device start-ups.

4. What did you study at university?

BE (Medical) at QUT.

Biomedical engineering vs biomedical science?

I think it depends on what it is that excites you most?

A lab-based or research-heavy role will be more available with a biomedical science qualification. Biomedical Engineering will offer more systems, frameworks and functional design opportunities.

Both will I have opportunities in compliance, manufacturing, research, testing, protocol and report writing and innovative thinking.

5. How do you think AI will influence the future of biomedical engineering?

In the recent future, I think we'll see growth in demand for biomedical engineering to develop AI in this space. In Australia, our education systems are only just starting to see a need for education in AI, and we are yet to really explore its potential, good, bad or otherwise. As a society we are still contesting electronic health records, professionals who lead decision making in healthcare are very determined to retain their ability to do so. The emerging generation will likely lead any meaningful change.

The internet of things (IoT) is currently developing in medical devices/healthcare, but I think it will be some time before technology catches up to develop the necessary but complex ecosystems that would be needed across the breadth of biomedical engineering application areas. It will certainly be quicker in some areas than others, though.

Will there be a career path in the future?

I believe there will always be a career path of sorts. An evolution of what we currently see relevant to any advances in systems and capability within the ecosystem. I also expect we will see growth in career opportunity before we see any decline.

6. Any suggestions for people we could contact to get some work experience?

Work experience opportunities can be highly competitive, as many biomedical engineering university students are targeting the same providers. Consider what interests you and target an area that will help you explore that interest. You may find it wasn't what you expected, which is still a great outcome, as you are left to explore other interests until you find your thing. The earlier you can do this the better.

Also, establish your networks early. If you do complete work experience somewhere, check in on them every now and again, especially until you are comfortably established in an area you enjoy. As a new member of your network, I look forward to chatting to you again soon!

It can also be beneficial to gain work experience in clinical areas (understanding clinical needs/problems/difficulties), and in particular those that participate in clinical research.