

**Samuel Cubero** *Ph.D, B.E. (Hons) Mech*      *Australian Citizen*      Born: 1972

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**AREAS OF EXPERTISE AND INTEREST** (also see list of publications)

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**Machine design & Manufacturing**

CAD: AutoCAD 2D (26 years) & 3D, SolidWorks (7 years), Inventor (5 years), ProEngineer WildFire (1 year)  
Load & material failure analysis: 2D & 3D force analysis (Statics), Solid Mechanics (Von Mises, fatigue etc.)  
Gearing & Power transmission design: Gear equations, power-train design (shafts, bearings), reflected inertia  
Machine component selection & design: Beam analysis, shaft analysis, design against yield failure & fatigue  
Actuators: Electric motors (DC brushed, brushless/stepper, AC, solenoid), hydraulic, pneumatic, PZT, SMA etc.  
FEA stress & deflection analysis: Free Body Diagram analysis, ANSYS, SolidWorks Simulation, Inventor FEA  
Structural analysis: 2D trusses & 3D space frames, design against failure (yielding, fatigue, buckling, vibration)  
Kinematics, Dynamics and Control simulation: Trigonometry, 2D & 3D vector analysis, State Space modelling  
Workshop skills (General fitting & turning / metalwork), plastics: forming / injection moulding, fibre-glass  
Experience with arc welding (Stick & MIG), drilling, turning, milling, sheet-metal work, sheet bending, etc.  
CAM (Computer Aided Manufacturing): MasterCAM for creating CNC machining code (for CNC mill / lathe)  
3D printing, rapid prototyping: ABS plastics, elastomers; 3D scanning and model creation (for casting patterns)  
Materials & manufacturing methods: Metals, plastics / elastomers, organics (woods), composites, casting, etc.

**Mechatronics, Robotics, Motion Control and Electronics**

Robotics / Automation / Motion control / Mobile robots / Manipulator arms / Walking vehicles / Exoskeletons  
PLCs (Programmable Logic Controllers): FESTO STL & Ladder PLC programming, Allen-Bradley PLC, etc.  
Low-cost Microcontrollers / Embedded systems: Atmel AVR chips, HC11 (assembly coding), 6809, Arduino  
High-level microcontroller programming: BASCOM-AVR (BASIC with optional inline ASM), CodeVision C  
Mobile robot design and testing: Design of mobile field robots; e.g. Remote Operated Vehicles (ROVs),  
Unmanned Underwater Vehicles (UUVs), UAVs (Unmanned Aerial Vehicles), hybrid robots, walking robots...  
Machine Vision (1D, 2D), Object recognition and identification: Software development, edge tracing, etc.  
Laser range-finding and 3D surface scanning (with custom-written 3D graphics display software for Windows)  
Sensors: Inductive, capacitive, optical; load cells, position, speed, flow, force, temperature, pressure, GPS, etc.  
Circuit design: Analogue & Digital electronics; Noise reduction; Schematic circuit design using CAD software  
Power supply and opto-isolated circuit design: Voltage regulation, rechargeable batteries, opto-isolators, etc.  
PCB (Printed Circuit Board) design and manufacturing (using Protel / Altium and/or Eagle CAD), acid etching  
Serial & data communications: RS-232, WinSock, USB, Zigbee (XBee Pro) wireless, LAN, WiFi and Ethernet

**Software development, Design tools & Software skills**

PC & Windows software development: Software development for MS-DOS & Windows (C/C++, Visual Basic)  
Serial communications programming: RS-232 COM port, USB/HID, WinSock, TCP/IP, network protocols  
Simulation & game programming: Visual Studio C++, VB, 3D game coding (Unreal Engine 4, DarkBasic Pro)  
3D Studio Max (1 year): 3D Object editing, modifiers, UV texture mapping, animation, lighting, camera control  
3D and VR game development: Unreal Engine 4, UnrealED map editor, HTC Vive, full body motion capture  
Video & Sound editing: Pinnacle, Nero Vision, Camtasia (screen-recorder), Audacity, Roxio PC Game Capture  
Website design & creation: HTML, FrontPage, Website X5 Evolution 9/10, IIS, ASP VBS, relational databases  
Microsoft Office & related tools: Word 2.0-2016, EndNote, Excel, PowerPoint, Access, Outlook, Project, etc.

**Essential 'soft skills', values and philosophies**

*Time management:* Goal setting, prioritizing objectives, planning & scheduling, monitoring progress / feedback  
*People skills:* Communication & negotiation / persuasion skills, Overcoming disagreements and conflicts  
*Teamwork:* Aim for win-win / consensus outcomes, avoid 'internal competition'; find out what each person wants and doesn't want (ask questions & listen well); grow the 'pool of knowledge'; the 'best idea' should win!  
*Leadership:* Motivate & inspire people to perform at their best; Set up a rewarding & productive environment; promote a culture of creativity, productivity & innovation; remove obstacles to productivity & progress.  
*Use QUICKER ACTION to get the best possible results:* (How to achieve the best performance as an engineer)  
**QUICKER:** Questions should guide all goals (good questions lead to good answers), Understand all variables / objects, Imagine relationships/connections & test them, Choose the simplest solution, Keep an open mind, Examine advantages and disadvantages of each of your options, Results only come from ACTION, not excuses.  
**ACTION:** Ask the experts for advice, Collect all necessary information / skills / parts / resources, Test all ideas & assumptions, Improve your ideas (plans & designs), Organise all activities and tasks, Never give up (Nothing builds credibility like finishing ability); Show positive emotions: Passion, Enthusiasm, Excitement & Optimism.

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**ACADEMIC QUALIFICATIONS** (Educated entirely in Australia, since pre-school)

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1998 Ph.D, Doctor of Philosophy (Mechatronic Engineering), University of Southern Queensland, Australia  
 1993 B.E. (Hons) Mech, Bachelor of Engineering Degree (Honours) Mechanical, University of Queensland  
 Wynnum State High & Coorparoo State High School; Wynnum West Primary School, QLD, Australia

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**UNIVERSITY TEACHING EXPERIENCE** (since 1998, approx. 19 years)

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<b>Curtin University</b> (Australia) EA accredited	308824 (E)	Mechatronic Project 234 (microcontrollers, mobile robotics) **	
	308828 (E)	Mechanical Design 321 (beam failure analysis, machine design) **	
	308809 (E)	Engineering Graphics 232 (AS1100 drawing, AutoCAD 2D/3D) **	
	(E)	Engineering Communications 321 (Excel, AutoCAD 2D/3D) **	
	308827 (E)	Mechatronic Automation 331 (Pneumatic circuits, PLCs, PID) **	
<b>USQ</b> (Australia) EA accredited	12906 (E)	Mechatronic Systems Design 431 (robotics, PC control, sensors) *	
	ENG4104	Engineering Problem Solving 4 (MATLAB simulation, control) *	
	MEC2304	Solid Modelling (ProEngineer WildFire, 3D parts & assemblies)	
	ENG4406	Robotics & Machine Vision (controller design, simulation, motor selection, forward & inverse kinematics, image filters & analysis) *	
	MEC2402 (E)	Stress Analysis (beam design, combined loading, failure analysis) *	
	ENG2102	Problem Solving 2 (PBL design/analysis of a real-world project) *	
	MEC2902	Mechanical Practice 2 (Warman contest, mobile robot design) *	
	ENG1101	Engineering Problem Solving 1 (teamwork, 1 <sup>st</sup> year PBL project)	
	<b>Petroleum Institute</b>	STPS201	STEPS 1 (PBL eng. design team project, SolidWorks 3D CAD) *
	<b>PI (UAE)</b>	STPS251	STEPS 2 (MS-Project, FEA, design & build mobile robot contest)*
ABET accredited (all courses are taught in English)	MEEG201 (E)	Statics (force / moment equilibrium, 2D/3D load analysis, beams) *	
	MEEG345 (E)	Intro to Manufacturing (machining, CNC G-code, workshop tools)	
	MEEG490/491	Senior Design 1 & 2 (2 semester) Final year engineering projects	
	ENGR293	Eng. Design in Community Service (design & build hardware) **	
<b>PI is now merged with Khalifa University</b>	ENGR110 (E)	Introduction to Engineering (calculations, design & build projects)	
	ENGR150 (E)	Intro to Eng. in the Petroleum Industry (seismic surveying, drilling)	
	ENGR111 (E)	Engineering Design (Design process, 3 design & build projects) *	

\*\* Created the original teaching materials (lecture notes, labs, assignments and tutorials) for these *new* subjects

\* New labs, tutorials, lectures, projects, or assignments & solutions were developed for these *existing* subjects  
 (E) means Examiner / sole lecturer / coordinator; No (E) means 2 or more teachers or a teaching team

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**MAIN FIELDS OF INTEREST & AREAS OF EXPERTISE** (see [www.samcubero.com](http://www.samcubero.com) )

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Product design & development, Project management, supervising PBL team-based design & build projects

Mechanical design, 2D & 3D CAD (SolidWorks, AutoCAD, Inventor, Protel), 3D simulation & animation

Mechatronics, robotics, mobile robots (remote controlled & autonomous wheeled and walking vehicles, UAVs)

Manufacturing, metalwork, plastics, composites, welding, CNC machining, MasterCAM, 3D scanning/printing

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**PRINCIPAL APPOINTMENTS**

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1998-2007 (9 years, tenured): *Lecturer in Mechanical & Mechatronic Engineering*, Curtin University of Technology, Perth, WA, Australia

2007-2010 (3 year contract): *Lecturer in Mechanical & Mechatronic Engineering*, University of Southern Queensland (USQ), Toowoomba, Australia

2010-present (current): *Assistant Professor in General Studies Department (August 2010-August 2017), Assistant Professor in Mechanical Engineering (starting August 2017), Petroleum Institute (PI), Abu Dhabi, UAE (United Arab Emirates)*

## **PROFESSIONAL EMPLOYMENT, EXPERIENCE & TRAINING**

### **2010-present: Petroleum Institute (PI), Khalifa University, Mechanical Eng. - Abu Dhabi, UAE (ongoing)**

In 2010, Dr. Cubero was offered 3 different positions at different Universities, namely, (1) a 3-year contract as a Lecturer for CQU: Central Queensland University, Australia, to teach electronics and control engineering; (2) Associate Professor position at PMU: Prince Mohammad Bin Fahd University, KSA (Kingdom of Saudi Arabia), to teach Mechanical and Mechatronics Engineering; and (3) an Assistant Professor position at The Petroleum Institute (PI), UAE, to teach 'STEPS' Problem Based Learning (PBL) courses (STEPS: Strategies for Team-based Engineering Problem Solving) and other engineering subjects for Mechanical, Electrical, Petroleum and Chemical Engineers; but position (3) was chosen because the PI position offered the highest salary, and the UAE offers a more 'western' and freer lifestyle than the KSA. The STEPS subjects at PI mainly focus on 'design and build' engineering projects, where teams of 4 or 5 students work together to solve real-world problems, create 3D CAD models and drawings (using SolidWorks), and build a real-world prototype which they must demonstrate. Students must use modern project management skills and tools (like MS-Project and MS-Office) to manage their time effectively and demonstrate the 'design process' over a 17 week semester (STEPS topics include problem definition, brainstorming, identifying objectives, constraints, functions, options / means / solutions, comparing different designs methodically using metrics / decision making tools, drawing realistic hand sketches, refining and improving mechanical designs, producing accurate 3D models, design for manufacture, design against yield and fatigue failure, combined loading analysis, selecting suitable fits / tolerances and manufacturing processes, and choosing suitable materials and components). At PI, Dr. Cubero taught the subjects "Statics", "Introduction to Manufacturing", "Engineering Projects in Community Service", "Senior Design 1", "Senior Design 2", "STEPS 1" and "STEPS 2", and achieved 'above department average scores' for every subject in almost every student survey that rates 'Teaching quality' and 'Lecturer rating'. Every year, he assists with creating / collating documentation for ABET (Accreditation Board for Engineering & Technology recently approved all of PI's engineering degree programs, including the STEPS subjects). He served on PI's website committee and also collected all the citations / publications information from all staff in his department. As a member of the IEEE (Section 8, UAE chapter) Robotics and Automation Society (RAS), Dr. Cubero worked on organizing events such as public talks, robotics competitions and activities with the help of other RAS members. Each year, he also served as a reviewer of technical papers for several different publishers and conference organizers, such as M2VIP, CLAWAR, JARS, IRIS, IEEE, etc. In 2012, Dr. Cubero achieved "exceeds expectations" performance evaluation results for his 'service' and 'research' (and managed to publish 4 technical journal papers and 2 conference papers, all single-authored, in just 1 year). At present, he is working on designing and simulating the kinematics of humanoid type exoskeletons and walking vehicles.

### **2007-2010: USQ University of Southern Queensland (3 year contract)**

Joined USQ as a lecturer in Mechatronic Engineering. Developed several new tutorials and online quizzes for teaching robotics, mechanical design, statics, stress analysis and microcontrollers for a range of different engineering subjects. Performed consulting work and developed robotic hardware and control systems for automatically training horses. At USQ, Dr Cubero supervised several successful student engineering projects in the areas of wireless data communications, new variable-compliance linear actuators, mobile robotics, 3D surface scanning using machine vision and microcontroller development. He supervised several successful engineering "design and build" projects in the areas of machine design and mechatronic engineering. He also developed the designs, equipment, tools and skills needed to build and test research projects such as:

- Fully operational robotic farming automation systems (using machine vision and GPS technologies)
- Autonomous and remote-controlled mobile robots and UAVs (flying robots) for different types of farm work (eg. soil tilling, seed planting, dispensing compost / water / pesticides, harvesting / gathering etc.)
- Force, speed and position controlled robotic actuators and manipulators (eg. Even exotic rubbery robot arms that function like an elephant's trunk, or an octopus leg; parts manufactured using 3D printers)
- Powerful robotic exoskeleton suits for humans to wear (which enhances human strength and endurance significantly in order to assist police, soldiers, healthcare workers, the elderly and infirm, and different kinds of manual workers or labourers who must perform physically strenuous jobs, often carrying heavy loads over long periods of time.) Such exoskeleton suits may also be used in future science-fiction action movies, similar to "Aliens", "Avatar", "District 9", and others, without using CG.

Dr Sam Cubero had also completed several 1 and 2 day "Professional Development" courses at USQ on topics such as: "Team Leadership", "Emotional Intelligence", "Conflict Resolution", "Supervising postgraduate student projects", "Preparing Teaching materials and assessments", "Moodle", "Online Quizzes", and other software used at USQ. In 2009, he completed a 30 hour "hands on" course on AutoDesk "Inventor 11" CAD (solid modelling) software at Toowoomba TAFE (i.e. model & drawing creation for 3D parts and assemblies).

**1998-2007: Curtin University of Technology (tenured position from 2001-2007)**

Worked as a lecturer in Mechanical and Mechatronic Engineering at Curtin University of Technology, Perth. Developed the original teaching materials for 4 new core subjects for Mechanical and Mechatronic engineering degree courses (all EA accredited and approved on all inspection occasions). Supervised over 60 final year mechatronic engineering projects. About 98% of these projects resulted in the successful design and development of new control methods, devices, robots and inventions leading to the publication of over a dozen refereed conference papers, and several commercial products. Attended several practical manufacturing courses at Subiaco TAFE (AMTC: Advanced Manufacturing Technologies Centre), Perth. Gained over 200 hours of hands-on training in metalwork (lathe turning, milling, arc welding, sheet-metalwork, etc), foundry practice and mould design, plastic & elastomer materials and manufacturing, and about 180 hours of MasterCAM training (2D, 2.5D, 3D surfaces & solid modelling, Toolpaths and NC code generation) and CNC machining.

**1995-1997 and 2002-2003: SPI “Straying Prevention Indicator” Commercialisation efforts**

Founder and managing director of “Advanced Innovations”, a private company involved in the design and development of low-cost, machine-vision-based driver fatigue warning devices which can alert sleepy drivers if their vehicle had strayed or drifted out of the current marked road lane. Several prototypes were successfully designed, built and demonstrated on the Channel 9 Today Show (story aired several times) and patents were filed. Unfortunately, out of dozens of companies that were approached, no local companies in Australia were interested in manufacturing and selling this fully operational, low-cost invention, even though it could save the lives of over 30% of all motorists who die each year due to driver fatigue, so the company was dissolved in 2003. Several car manufacturers managed to mimic and imitate this invention with their own different designs.

**1993: Final-year engineering project work for University of Queensland**

Designed all the mechanical hardware and developed software for a new 5-degree-of-freedom “slug inoculation gantry robot” for a semi-automated casting production line at Toowoomba Foundries Pty Ltd.

**1992-1993: Industrial work experience for University of Queensland**

Mechanical Engineer at Mindustrial Design & Management Services, Capalaba, Brisbane. Programmed several AutoLISP applications for automating AutoCAD drawing procedures based on geometric data from a database of catalogue dimensions for standard sections (BHP beams like ASB, PFC, EA, UA, and hollow tubes like RHS, SHS, CHS), and bolts, etc. Automatic drawing of steel sections, standard bolts, and MIM standard stairs with tread was made possible with this software, which increased CAD drawing productivity by more than 10 times.

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## **SHORT BIOGRAPHY**

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Sam Cubero was born in the Philippines in 1972 and arrived in Australia with his parents when he was 2 years old, in 1974. Sam learned how to program a computer at the age of 10 (Tandy TRS-80), and developed educational and graphical adventure game software for the SEGA™ SC-3000 and Microbee personal home computers. During high school, Sam taught himself BASICA and GWBASIC programming for IBM PCs and developed several educational and adventure games during his lunch breaks. He had also won 25 gold medals, 13 silver and 8 bronze medals in classical piano playing competitions from the age of 7 to 13. At age 14, Sam won the "Junior Piano Championship" trophy at the Wynnum/Manly Junior Music Eisteddfod, Brisbane. At high school, Sam earned the highest marks and straight “A” grades in almost every subject that he studied in every year, including maths, science, computer subjects and technical drawing/graphics, resulting in a “Tertiary Entrance Score” of 975 / 990. His high school teachers recommended that he pursue a career in engineering.

In 1990, Sam Cubero enrolled to study Mechanical Engineering at the University of Queensland, Brisbane, and excelled in mechanical design, control theory and mathematics (earning mostly “Distinctions” or 6/7 grades).

During 1992-1993, Sam worked as a full-time engineer (as part of student work experience) for a local engineering company (Mindustrial Design & Management Services), preparing BOM (Bill Of Material) parts lists for metal smelting plants, and creating drawings. Sam automated many tedious and time-consuming AutoCAD drawing procedures by programming AutoLISP routines for automatic drawing of standard beam sections, bolts, staircases with standard tread, etc. which increased drawing productivity by more than ten times. What would normally take draftsmen several hours to draw manually on AutoCAD, would take only less than a minute, using his custom-written AutoLISP drawing automation software. This software automated many repetitive drawing tasks by using equations to process standard catalogue dimensions in a database, to draw complex shapes, standard sections and lines, just like a human CAD operator, but almost instantly.

Sam completed his BEng (Bachelors Degree), with Honours, in Mechanical Engineering at the end of 1993 at the University of Queensland, Brisbane, and decided to focus his interests on a career in robotics and automation technology. Sam enjoys computer programming, mechanical design and building new practical inventions.

From 1994 to 1997, Sam studied under a world famous Professor of Robotics & Machine Vision, John Billingsley, to complete a PhD in Mechatronics, where he designed and built a position, speed and force controlled pneumatic actuator using a "world first" proportional flow gas valve design (known as the FPGV, or "Floating Plate Gas Valve", which is a variable flow air valve whose airflow is regulated by a controllable electromagnetic field, and it only has one moving part, i.e. a floating plate that hovers without any external supports! ). Sam later went on to use this device to drive the 12 degrees of freedom for a 4-legged pneumatic walking robot, known as the "STIC insect", which is on display at the Sydney Powerhouse museum. Over a period of a few weeks, Sam Cubero also invented, designed and built the "SPI" (Straying Prevention Indicator) device which can wake up sleepy drivers when their vehicles drift out of a marked road lane, through an audible alarm. The SPI uses adaptive machine vision technology to watch for painted road lines that cross underneath the front wheels of a vehicle. This invention was patented and demonstrated several times on the Channel 9 "Today Show" in 1996, however, several car makers copied the SPI concept and built their own versions (but their imitations were much more expensive and more unreliable compared to the original dual camera SPI.) Still, today, there are no systems like the "SPI" which are as reliable as a human road line watcher, able to reliably avoid false alarms and sunlight saturation problems. Due to lack of interest in Australia, the SPI project was "shelved" and the critical features of the 40+ page software control code were never published nor patented.

From 1998 to 2007, Sam Cubero worked as a lecturer at Curtin University of Technology, Perth, Western Australia, and was able to regularly publish technical papers describing new innovations, each year. At Curtin, Sam developed new teaching materials and taught the subjects: "Mechatronic Automation" (PLC programming, pneumatics, hydraulics, control circuit design, factory design, etc.), "Mechatronic Project" (microcontroller programming & mobile robotics), "Mechatronic System Design" (robotics and motor control), "Engineering Graphics" (AutoCAD 2D & 3D, Inventor, design for manufacture, choosing tolerances and fits for manufacture, etc), & "Engineering Communications" (Excel spreadsheets, PowerPoint, report-writing, etc). Sam Cubero authored or co-authored over a dozen technical papers describing novel and operational robotic devices and inventions developed under his supervision and team leadership. Dr Cubero also hosted the 1996 "Robot Wars" competition at Curtin University, which involved several rounds of destructive combat between 16 different "fighting robots", and this entertaining contest was televised on Channel 10 news (Australia) and was featured in an article in the "Engineers Australia" news magazine.

In mid 2007, Sam moved back to Queensland (closer to his family and relatives in Brisbane) and accepted a 3-year contract to work at the University of Southern Queensland (USQ), assisting in the teaching and delivery of several engineering subjects, such as "Solid Modelling" (using ProEngineer WildFire), "Engineering Problem Solving" (1, 2 and 4, involving PBL projects), "Mechanical Practice 2" (mobile robotics), and Sam was the lecturer / examiner for "Stress Analysis" (safe beam design for combined loading, failure analysis, stress analysis, material selection, bolt & weld analysis, etc.) Sam has received many praises and thanks from very satisfied students who have described him as: "favourite lecturer", "an excellent lecturer", and someone who 'makes complex concepts and topics easy to understand.' (Please read the "Reference\_letters.zip" file on the [www.samcubero.com](http://www.samcubero.com) website.) Unfortunately, Dr Sam Cubero did not find much opportunity to perform research working during 2007 to 2010 due to the very high teaching and marking workload at USQ (where the student : staff ratio was typically around 100:1 or sometimes even 150:1, due to the high number of external students at USQ; this ratio is much higher than the 40:1 to 50:1 ratio that existed at Curtin University of Technology. About 60-80 hours of teaching or marking work was necessary (and expected) each week at USQ, leaving very little time and energy available for applying for grants and conducting serious research work.

Sam Cubero had supervised more than 70 successful "design & build" engineering projects relating to robotic arm development, mobile robots (including flying robots or UAVs), optical machine vision and recognition, 3D laser scanners, 3D simulation/animation software development, telemetry, wireless data communications, PC / Windows programming (eg. serial communications protocols), microcontrollers (eg. HC11 assembly programming and Atmel AVR microcontroller chip programming), and automation hardware development.

In Australia, Dr Cubero had occasionally been involved in independent engineering consulting work for the manufacturing, agricultural, healthcare and entertainment industries. Several of the projects he had supervised had led to the successful commercialisation of useful products and the implementation of industrial automation equipment that is currently in use. eg. "Hard-hat impact testing machine", "Automated soil hardness testing machine", "5-axis MIG welding gantry robot", "RFID tag component assembly system", "Flying VTOL car",

and several different automation systems for factories, based on custom software for PCs (8255 I/O, DAC, ADC cards) and PLCs. Dr Cubero also serves as a paper reviewer for various conferences, books and journals relating to mechatronics and robotics.

In 2010, Dr Sam Cubero was offered a good paying position at the Petroleum Institute - PI (University and Research Centre) located in the UAE (Abu Dhabi, near Dubai, United Arab Emirates – totally tax free zone). He has been working there ever since, teaching SolidWorks (3D solid modelling), Engineering Graphics, Design-and-build projects, Statics, Manufacturing and other undergraduate subjects. Over the years, Sam Cubero had supervised several ‘award winning’ final-year (Senior Design) projects at the PI, including one involving the design and manufacture of an ‘automated car parking system’ (scaled down model of a robotic system that automatically stores and retrieves cars in a parking lot) which won the ‘Best engineering student project’ award in the UAE, out of over 50 different competitors.

Over the years, Dr Sam Cubero had acquired and developed many useful skills in the areas of:

- Website design & creation: FrontPage & Dreamweaver, ASP / VBScript, IIS, Access, SQL databases
- Video/audio editing, conversion / production: Pinnacle Studio, U-Lead, Roxio, Audacity, Nero Vision
- Moodle and WebCT LMS (Learning Management System) software: Setting up online exams and tests. eg. automated marking of different types of technical questions and calculated quizzes and automatic online recording of grades; Online collection and grading of assignments and reports, etc.
- 3D game programming and simulation: DarkBasic Pro, 3D Studio Max, Unreal Engine 4 development
- Management & Psychology: Effective principles of time management, team leadership, conflict avoidance and resolution, “Emotional Intelligence”, etc. (several Professional Development courses).
- Project and business management skills: people skills, budgeting / cash flow analysis, MS-Project, etc.
- Health, good nutrition, power-lifting and amateur bodybuilding (he currently bench presses over 140 kg for several sets and repetitions, shoulder presses 120+ kg, squats over 300 kg for several sets and reps and is working on gaining more muscle strength, muscle mass and lower body fat).

Dr Cubero currently has a growing audio-book collection (on CD) and book / e-Book library containing more than 1000 different titles, most of which he has already studied and put into practice. In his spare time and usually on weekends, he regularly studies popular ‘self-help’ books or listens to CD audio-books on the topics of money management, investing, people skills, business development, effective communication skills, time management, human psychology, philosophy, ‘weird’ science (like ‘free energy’ power generation), organic / natural farming, natural health and nutrition. He is also enjoys regular weight-training in the local gym.

You can view some sample movies of Sam Cubero’s past projects and a brief description of his interests and skills at [www.samcubero.com](http://www.samcubero.com).

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## HOBBIES & EXTRACURRICULAR INTERESTS

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- Studying new books, magazines & websites (e.g. personal improvement, computer programming, 3D game development & modelling etc.)
- Regular physical exercise: eg. Zumba dancing, long walks with my wife, swimming, gym/weights
- Occasional Piano playing: Classical music (8 years formal training), Jazz / Blues music & improvising
- Music composition (using chords) & Singing: Created over a dozen original songs & new MIDI music
- Occasional playing of chess: ELO rating ~ approx. 1500
- Occasional watching of big-budget science-fiction / action movies.

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## CAREER HIGHLIGHTS

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### 2010 – Now

- Visited Abu Dhabi, UAE (an oil-rich Middle East country), near the famous city of Dubai (which is one of the world’s most modern and wealthiest cities) for the purpose of attending 2 job interviews.
- I was offered an “Associate Professor” position in the Mechanical Engineering Department at PMU (Prince Mohammed Bin Fahd University, Dammam, KSA – Kingdom of Saudi Arabia), around mid 2010, but this offer was declined because a higher paying position was offered at “The Petroleum Institute”, Abu Dhabi, UAE, which offered a salary approximately 32% higher than PMU.



- Out of consideration for my wife, who had warned me that freedoms are very limited for women in KSA, I accepted the “Assistant Professor” position at PI and began teaching undergraduates in the Fall (2<sup>nd</sup> semester), 2010, teaching ‘STEPS’ subjects. This involved teaching students how to manage and develop PBL (Problem Based Learning) team-based design-and-build projects for a mixed variety of 2<sup>nd</sup> year and 3<sup>rd</sup> year engineering students (Mechanical, Electrical, Chemical, Petroleum Engineering, and Geoscientist students) at the Petroleum Institute (PI).
- The STEPS 1 and STEPS 2 subjects that I taught consisted of 2 (17-week) semesters of ‘design, analyse, document and build’ type projects that aim to solve a real-world problem using a standard ‘Engineering design process’. These 2 (4 contact hour per week) subjects are based on the courses developed by the Colorado School of Mines (CSM, USA) and are managed by the PI Arts & Science department, in cooperation with the Mechanical, Electrical, Petroleum Engineering & Geosciences and Chemistry departments. STEPS subjects recently received ABET accreditation, along with all the PI engineering degree courses. Each STEPS project involves a great deal of creative problem solving (in teams), 3D SolidWorks CAD modelling (which I teach), and regular project presentations. STEPS 2 focuses on prototype design and manufacturing (building real hardware for actual demonstration). For example, in 2013, students were required to work in teams to design and build a mobile robot / vehicle to pick up as many bottles at the other end of an obstacle course and return these bottles to a drop-off area, within a limited time period. I helped organize the competition rules and I designed the track for this very successful STEPS 2 design-and-build contest in 2013.
- As invited speaker, I gave talks / seminars at organized events, conferences and technology exhibitions.
- Supervised many ‘final year’ projects relating to robotics, motion control and machine design, and assisted the Mechanical and Electrical engineering departments at PI.
- Participated in two Young ADIPEC Roadshow ‘High School’ visits, teaching over 100 students how to design and build electronic circuits and a speed controller for variable speed control of a DC motor.
- Won 3 competitive research grants of 85,000 AED, 200,000 AED and 50,000 AED in 2011, 2012 and 2015 for robotics research and 3D simulation projects
- Studied and became competent at using SolidWorks for 3D solid modelling (with FEA simulation), MS-Project (for organizing projects using Gantt Charts), 3D Studio MAX for 3D animation and DarkBasic Professional (for 3D game programming on Windows PCs). Currently learning Unreal Engine 4 and game development tools.
- Invited to present 2 x 30 minute talks (with video presentations) at 2 different IEEE RAS (Robotics & Automation Society) seminar events, organized in Abu Dhabi.
- Served as a judge for the AFRON 2013 and 2014 robotics and curriculum design competitions.
- Participated in many technology events, exhibitions and school visits to promote engineering education, e.g. Young ADIPEC (High School visits), ThinkScience, TDC Innovator, IEEE RAS
- 2016: Won the “Best paper presentation” award at the International Conference on Society, Education and Psychology, in Dubai, for the paper: “Essential Communication Skills for Engineers, Scientists and Multi-disciplinary teams” (see list of publications). This paper was also reprinted and featured as the first paper in an international journal.

#### **2008-2010**

Successful design, development and testing of original student projects that Dr Cubero supervised at USQ:

- A large-scale 4-wheeled mobile robot for training horses for rodeo competitions (project funded by local horse trainers Mike Lawlor & Mark Buttsworth).
- Successful design and construction of a variable speed ‘robot cow’ on a rail platform for training horses
- A fully operational 3D surface scanner relying on a hybrid machine vision / laser scanning system
- A wireless network system for mobile robot communications / remote control and telemetry applications.

#### **2006-2007**

Sam Cubero appeared on Channel 10 News story promoting Mechatronics Engineering on a short 2 minute story about a “Robot Wars” competition which he organized and hosted at Curtin University of Technology, Perth. 16 fighting robot vehicles fought each other over several elimination rounds. (Subject: Mechatronic Project 234) This story also appeared in a 2006 “Engineers Australia” magazine article. Sam Cubero was also interviewed by several radio stations, internet news reporters and newspapers in Perth, describing robotics, mechatronics and machine vision. During 2006, Dr Cubero’s students designed, built and demonstrated:

- A successful VTOL quad-rotor UAV (Vertical Take-Off & Landing, Unmanned Aerial Vehicle), the first of its kind in Australia which can automatically self-stabilize. (Other Universities failed to achieve this!)
- A hydraulic robot arm manipulator that can position its end effector accurately, following a 3D model

- A robot arm for an electric scooter that collects and retrieves heavy far-away items on high grocery shelves. This project was funded by Linak Australia and Scooters Australia P/L.
- A robotic soil hardness testing machine that automates the standard “Drop Hammer” impact test. PC software produces “Soil penetration vs. Number of drops” graphs and stores database records of test results. This project was developed with the assistance and industry funding of EVH Drilling P/L (Perth).

### 2005

Dr Cubero was invited to present a 3 hour video seminar at De La Salle University, Manila, Philippines, at the IEEE “Mechatronics & Machine Vision In Practice” International Conference, describing dozens of robotics projects that he had supervised at Curtin University of Technology. He was also invited to present the same seminar at the University of Batangas before an audience of over 1000 academic staff and students in attendance, and he was awarded a “Plaque of Appreciation” by the Chair of Regents of that University, Governor Vicente E. Mayo (and was given several free guided tours around that area!) Dr Cubero also supervised student projects which resulted in the successful design, development and testing of:

- A fully operational, high precision 3D surface scanner and PC software for plotting scanned solid surfaces using 3D graphics. This project was developed with the support of sensor manufacturer & supplier SICK.
- A secure “Online Assessment System” (OAS), similar to WebCT and Moodle, which allows teachers/instructors to edit and develop their own teaching materials and graphical quiz questions for deployment and automatic marking over the internet. Student marks are recorded in a class database and result reports are created. The OAS can be developed further to cater for almost any kind of teaching material or different types of user input, and it was demonstrated to run successfully on a public web server at Curtin University of Technology. The OAS was created using VB, ASP/IIS and SQL Server databases.
- A fully operational hydraulic power-pack circuit to drive the legs of a 6-legged walking vehicle (Hydrobug). This project was funded by local companies and hydraulic component suppliers, including Prime Hydraulics Pty Ltd, Parker-Hannafin (Hydraulics), and several other automobile parts suppliers.
- A fully-autonomous, self-steering, self-driving vision-guided mobile robot (wheeled vehicle) with an ANN (Artificial Neural Network) learning program that can learn how to drive and remain only in the “left lane” (based on observing human driving habits). It can also perform automatic vehicle overtaking manoeuvres.

### 2003

- Hosted IEEE “Mechatronics & Machine Vision In Practice” International Engineering Conference, Perth
- Design, construction and demonstration of a flying “UFO-like” UAV with no moving parts
- Successful development of low-cost (under \$100 each), self-driving, fully autonomous, machine vision guided mobile robot racing cars, suitable for use in robotics competitions between different Universities.

On several occasions, Dr Cubero had participated in promoting interest in engineering by presenting “hands on” demonstrations and seminars during various High School visits and public science fairs and exhibitions. He participated in a number of different mentoring programs over the years, assisting, supervising and encouraging young students as they gained practical experience and skills in designing and building motor controllers and mobile robots.

### 1998

- Awarded a Ph.D in September, 1998, for completion of the Dissertation: “*Force, Compliance and Position Control for a Pneumatic Quadruped Robot*”, submitted to the University of Southern Queensland (USQ) Faculty of Engineering and Surveying.
- Started work as a Lecturer in Mechatronics and Mechanical Engineering at Curtin University of Technology, Western Australia, where I started teaching subjects like Engineering Graphics, Mechanical Design (Solid Mechanics / Beam theory / Stress and Failure analysis), Automation (PLC programming, pneumatic circuit design, motion control and simulation).
- Starting 2001, I began developing the “Mechatronic Project 234” Microcontroller programming labs and lecture materials to help students learn how to design, build and control their own mobile robots and embedded controller devices. This subject alone made a significant improvement to the practical skills of all mechatronic engineering students at Curtin University, and it is still taught there until this day as a core subject. Since the introduction of this subject ‘Mechatronic Project 234’, Curtin University students started using Atmel™ AVR microcontrollers for many different kinds of practical embedded controller applications such as data-loggers, SAE racing car engine and vehicle monitoring computers, motor position and/or speed controllers for brushed DC motors and brushless / stepper motors, industrial-grade soil hardness testing equipment, controllers for remote-controlled vehicles and vision guided mobile robots, UAVs (Unmanned Aerial Vehicles), controllers for walking machines, telemetry / wireless



communications for 'smart sensors', actuator controllers for robots and low-cost controllers for variable-force gym equipment and automatic 'weight training' monitoring and spotting (failure assisting) equipment. AVR microcontrollers have also been used in several masters and Ph.D research projects to develop low-cost and reliable controllers and data-acquisition/ sensor-monitoring equipment. You can see many more examples of AVR based controllers and research projects at [www.samcubero.com](http://www.samcubero.com)

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**PUBLICATIONS & CONFERENCE PAPERS** (all peer reviewed and published)

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- (39) S. N. Cubero, "Over-speeding Warning System using Wireless Communications for Road Signs and Vehicles," in Proc. 13th Int. Conf. on Engineering & Technology, Computer, Basic & Applied Sciences, (ECBA 2016), 10-11 June, Dubai, UAE, 2016. (ISBN No. 978-969-670-549-9)
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- (31) S. Sorby, S. N. Cubero, N. Pasha-Zaidi, H. Karki, "Spatial Skills of Students in the United Arab Emirates," In Proceedings for the Engineering Leaders Conference on Engineering Education, Doha, Qatar, 2014.
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- (4) S. N. Cubero, J. Billingsley, "Automatic control of a surface adapting, four-legged wall climbing robot", Mechatronics '96 With Mechatronics & Machine Vision in Practice '96, University of Minho, Geumaraes Portugal, September 1996, pp 1.135-1.142.
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- (2) J. Billingsley, S. N. Cubero, "High speed manipulators for agricultural applications", Proc. 1995 National Conference of the Australian Robot Association, Melbourne, July 1995, pp 54-58.
- (1) S. N. Cubero, J. Billingsley, "Automatic surface transition adaptation for a quadrupedal space frame robot", Proc. Second International Conference on Mechatronics and Machine Vision in Practice, Hong Kong, September 12-14, 1995, pp 113-118.

NOTE: There are a few more papers - not listed above – that were not published or are now in the process of being reviewed and considered for publication. On average, about 2 papers were published per year since 1998. These peer-reviewed papers cover topics in robotics, sensors, machine-vision and education.

Google Scholar citations: (click on "29 ARTICLES" to view PDF papers or abstracts)

[https://scholar.google.com/citations?view\\_op=new\\_articles&hl=en&imq=Samuel+Cubero](https://scholar.google.com/citations?view_op=new_articles&hl=en&imq=Samuel+Cubero)

Example paper: (PDF format) <http://ijssst.info/Vol-13/No-2/paper5.pdf>

Research Gate.net citations: (click to view many indexed PDF papers or abstracts)

[https://www.researchgate.net/scientific-contributions/2067206054\\_Samuel\\_N\\_Cubero?claimPup=true](https://www.researchgate.net/scientific-contributions/2067206054_Samuel_N_Cubero?claimPup=true)

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## **STUDENT TESTIMONIALS & TEACHING EVALUATIONS**

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The following comments are just a few samples of “word-for-word” extracts from actual student surveys and feedback reports collected over the years. For the purpose of protecting student privacy, the names of actual students who made the following written statements have been omitted. The original source documents or student survey reports containing each of the following comments can be presented to you in person if required.

### **Curtin University of Technology “Mechatronic Project 234” (microcontrollers, mobile robotics)**

“Sam is an excellent lecturer with a lot of experience. I found the labs to be well equipped and managed. The challenge at the end of the semester “robot wars” was a great motivator and inspired me to put a lot of effort into my final project. I also found the lecture notes to be complete and a great resource.”

“The labs help you to perfectly understand the lectures!! Brilliantly structured!!”

“Very good hands on work on implementing circuits and programs so that students would understand most of what is being done.”

“Many practical sessions allow students to apply knowledge learned in lectures to real life problems.”

“This unit [Mechatronic Project 234] is already very well organized and well taught.”

“It’s perfect!!” ...

(Face to face comments from students: “All the students look forward to doing your subject the most... It’s just so much fun! ... This is the only subject this year where we get to design and build something, while the others are mostly just theory.” ... “Your labs are excellent.”... “This is the best subject ever, period!”... )

### **Curtin University of Technology “Engineering Graphics 232” (AS1100 drawing, AutoCAD 2D & 3D)**

“The labs were great! The assignment was also well designed.”

“Demonstrations in lectures provided ample information to complete the set tasks. Labs were very helpful.”

“The labs and examples in the lectures were very helpful.”

“This unit grooms us for real life drafting and it has done so very much with the unit project that tests every aspect of the unit.”

### **Curtin University of Technology “Mechanical Design 321” (beam failure analysis, machine design)**

“Lecturer was excellent and knew his material.”

“Tutorials were very helpful.” ... “Sam is very motivated.”

“The assignments helped me apply learning outcomes to real engineering design problems and solve them with confidence.”

“Designing your own product made things interesting. Worked examples and information on WebCT were helpful.”

### **USQ ENG2102 Engineering Problem Solving 2: “Wind Power Turbine Analysis / Wind Farm Design Project” (2008) and “Ski Lift Design & Analysis / Ski Field Design Project” (2009)**

(NOTE: EXT or “external” students are “Distance Education” students who were provided technical assistance and guidance through online forums and discussion boards that are monitored and answered almost every day.)

“Sam is a top guy, and one of the good lecturers I’ve come across, especially being external... He is pro-active in supporting us externals and earns his money.”

"I would also like to thank Sam Cubero... he helped a lot in the machine design area and was very pro-active to myself and all students."

"I would like to take the opportunity to thank you [Sam] very much for all your mentoring and guidance and support. You were always there for me when I had an issue and I thank you for that. You provided me with information that made me rethink my approach to various problems which has allowed me to develop my problem solving skills even further. I do not think I would have achieved what I have if not for your assistance, detailed explanations and prompt responses... Once again Sam, thank you very much and I do hope our paths cross again sometime during the course of my degree."

"Thanks also for the effort you have put into this course, without your tutorials I would be still scratching my head. The extra effort you put in doesn't go unnoticed."

"Thanks again for all your hard and great work in helping students understand the mech eng concepts better."

"Thanks very much Sam, out of all the staff I came across during the course you provided the most feedback and helpful information. Cheers."

"I agree, thanks Sam for the prompt responses and in-depth feedback. The tutorial videos were greatly appreciated also. You have definitely put in much effort for the benefit of us students. Thanks again."

"I still appreciate every comment Sam has posted. Not only answering every question but going into further detail for our own benefit... Having many hours of very helpful, easy to understand and down to earth concepts has been the only thing getting me through this course. I also am studying engineering statics and Sam has been able to help me understand things taught in there much more clearer. So I would just like to say a very big thanks to Sam for all the effort he has put in this semester to help all of us out. You deserve a fair bit of credit Sam. Thanks again!"

"Sam has put a great deal of effort in to try and teach us not only Mechanical specific topics, but also some 'lifelong learning skills', our attitude to learning..." ... "I will remember some of the things you said..."

"Sam, you have put in a huge effort and personally taken the time to try and answer everyone who has asked a question of you. The amount of time you have dedicated has been massive ... To keep on top of that as well as do up all those tutorial videos (by the way, I found that to be a big help... even though I struggled) ... is truly appreciated... Thanks again Sam."

**USQ MEC2402 Stress Analysis (Semester 1, 2009) SELTS and SETS student survey comments:**

"He [Sam] is an asset to the Uni, and like myself, I am sure that future students will benefit from his tutoring."

Q: What improvement would you suggest to the course itself ?

A: "None. Just make sure you keep the lecturer, he is great."

"He [Sam] is a very good lecturer, and his way of teaching is very effective. He is very helpful and cooperative." ...

"The best lecturer I have had in 6 years external study with USQ."

"I would like to personally thank Sam Cubero. He is a shining example of what a University lecturer should be, a teacher first and an academic second."

Q: What did you find were the most helpful / effective aspects of this course?

A: "Sam's professional approach to the course, he was there for anyone who needed help, provided ample and excellent information and had our assignments returned promptly to assist with next assignments or exam prep. Best course I have been involved in at USQ. Well done Sam..." "Everything is good..."

"Lecturer [Sam] was prompt with replies to all calls for assistance for myself and other students. Personally I wish I had this type of support throughout my study to date. Also it is the kind of prompt assistance that I expected some years ago."

“the lecturer was very helpful”

“So much of this course was so much better than previous courses.”... “This is the first course that I think I have learnt the content but it has been the hardest. Well done to the lecturer.”

“Sam Cubero went above and beyond the call of duty with respect to assistance. With all due respect to past and previous lecturers, I have never come across a lecturer so committed to the success and welfare of students. He would answer queries at any time of the day (and night!) and would include additional examples and web links to assist with the problem.”...

Q: What did you find were the most helpful / effective aspects of this course?

A: “Study material, lecturers and tutorials were very good. Very good lecturer response for this course.”

A: “Sam’s explanations on StudyDesk – by far the best examiner that I have come across.”

“Very good study material and text. Excellent support from Sam. Prompt, helpful and detailed responses to queries. Sam’s philosophising and motivational quotes were also quite amusing and appreciated!”

“Great course with awesome support from Sam.”

“I would like to comment on Samuel Cubero. This lecturer is one of the most dedicated, thorough, helpful and knowledgeable individuals I have ever come across. As an external student, these qualities have assisted me in being less stressed and having a better understanding of the material.”

“On a scale of 1 to 10, I would give [MEC2402 Stress Analysis] an overall rating of 9/10.”

“He’s very knowledgeable and knows interesting applications of the subject to make the content interesting.”

“Awesome worked examples!”

Some students noted lecturer strengths like: “Interest in the course”, “Relevance to real world situations”, and “Having in-depth knowledge in the course and makes the subject interesting while teaching.”

“I thought the exam was good and I thank Sam for preparing us well for the exam.”

“This lecturer [Sam] has responded better than any other USQ lecturers I have had. His dedication and mentoring to external students is fantastic. If only the other USQ lecturers have the same enthusiasm. I thought the exam was great!”

“I like how you give all the information to students. That’s very good help for an external student...”

“... Thanks Sam for no nasty surprises and a good course.”

“I can honestly say Sam, that you are the best lecturer I’ve come across so far at my studies with USQ. You provide outstanding and timely support/feedback with any question posted on these forums and you even reply after hours and on weekends! No other lecturer I’ve come across yet does that, in other subjects sometimes you are even lucky to get support or a reply!”

“Yes Sam, you’ve done a great job. Favourite lecturer!”

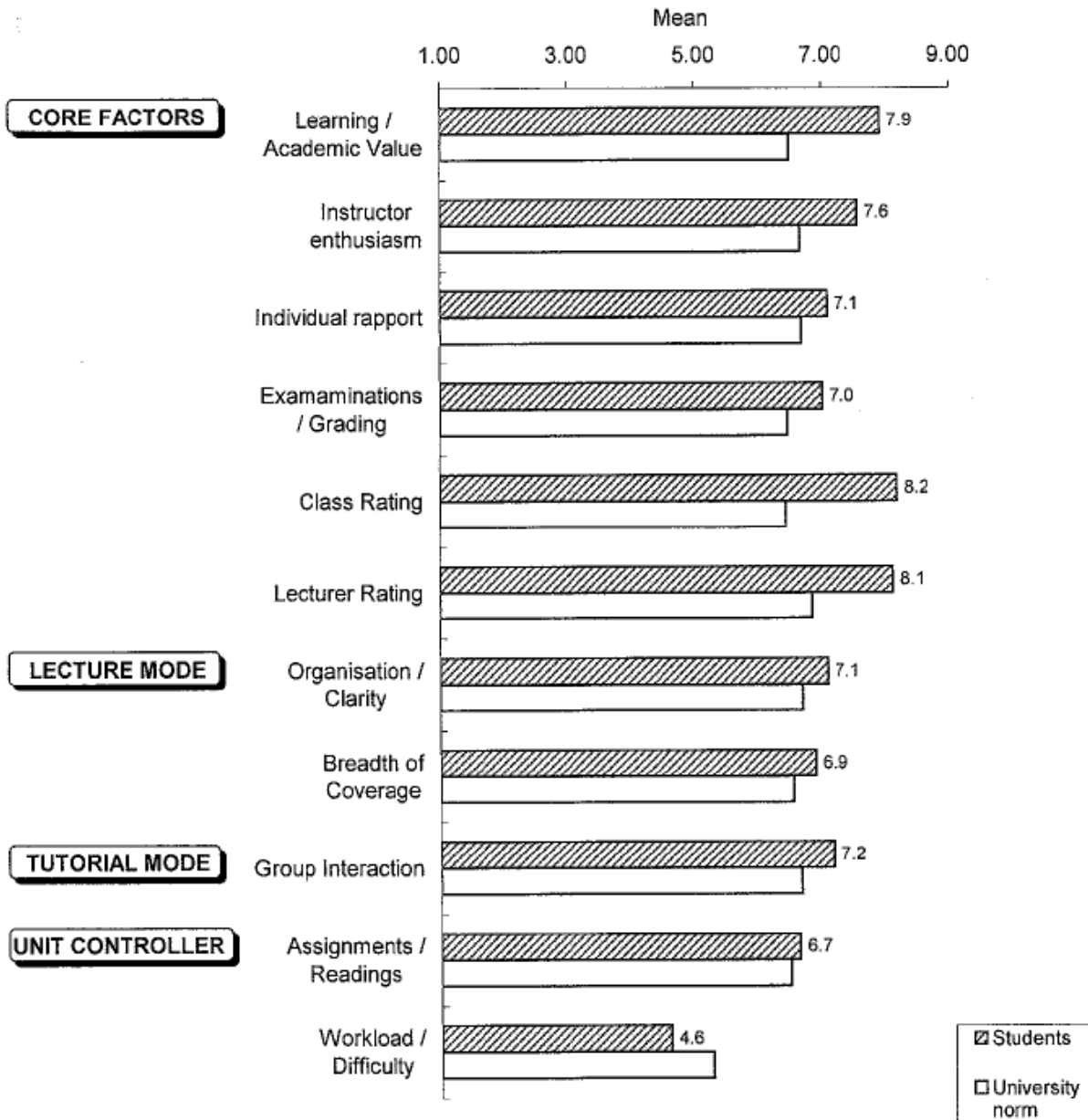
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The following sample summary reports compare student survey evaluation results on teaching performance to University norms (averages).

## Student Evaluation of Educational Quality (SEEQ) SEEQ New Form

**Teaching Evaluation - Summary Report, Curtin University**

Subject: <b>Mechatronic Project 234</b>	Administered on: <b>30-May-06</b>
Teacher: <b>Sam Cubero</b>	No. students responding: <b>18</b>
School: <b>Mechanical Engineering</b>	Percentage response: <b>100%</b>



Printed: 08-Jun-06

Reg# 96

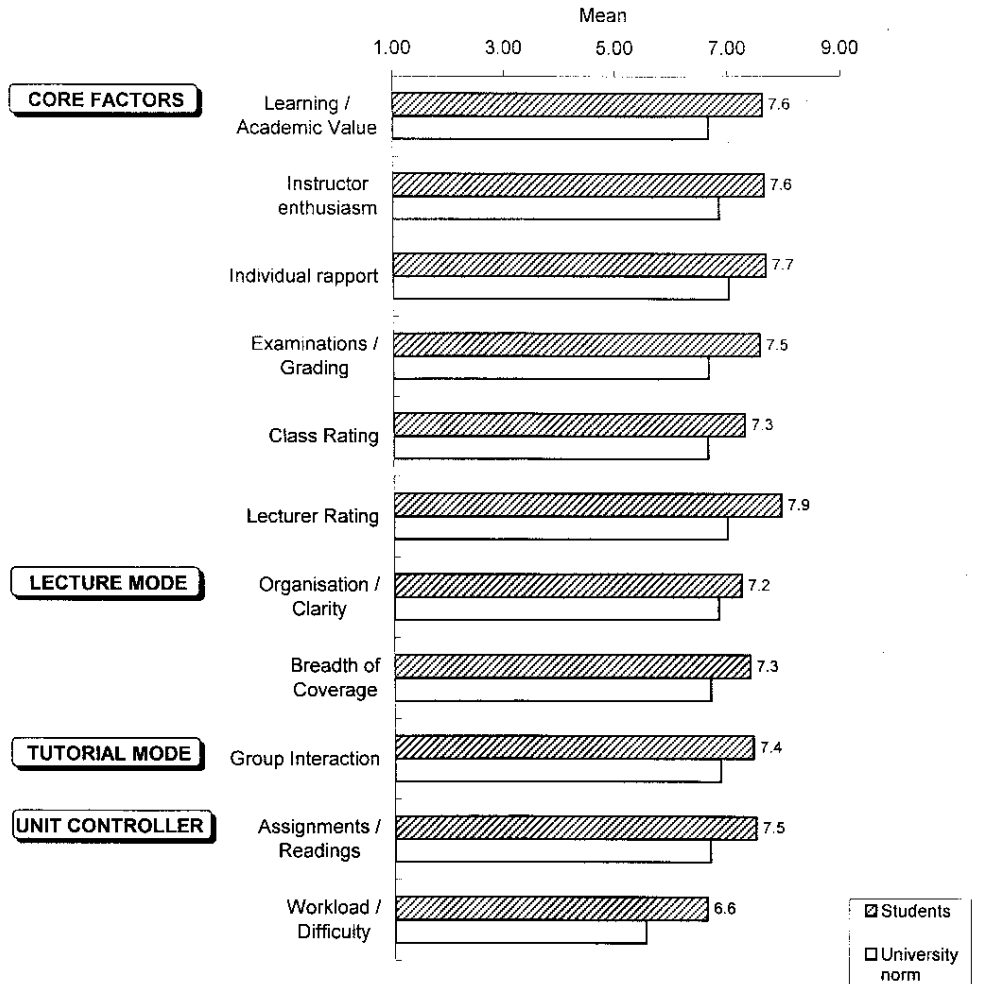
**NOTE:** "Mechatronic Project 234" taught students how to build and control their own mobile robot and weapon system (using an AVR microcontroller) to compete in a final Robot Wars competition (televised on Channel 10 News, Australia, June, 2006.)



**Student Evaluation of Educational Quality (SEEQ)  
Curtin University of Technology**

**Summary Report**

Subject: <b>Mechatronic System Design 332</b>	Administered on: <b>6-Jun-03</b>
Teacher: <b>Sam Cubero</b>	No. students responding: <b>11</b>
School: <b>Mechanical Engineering</b>	Percentage response: <b>100%</b>



Printed: 19-Jun-03

Reg# 717

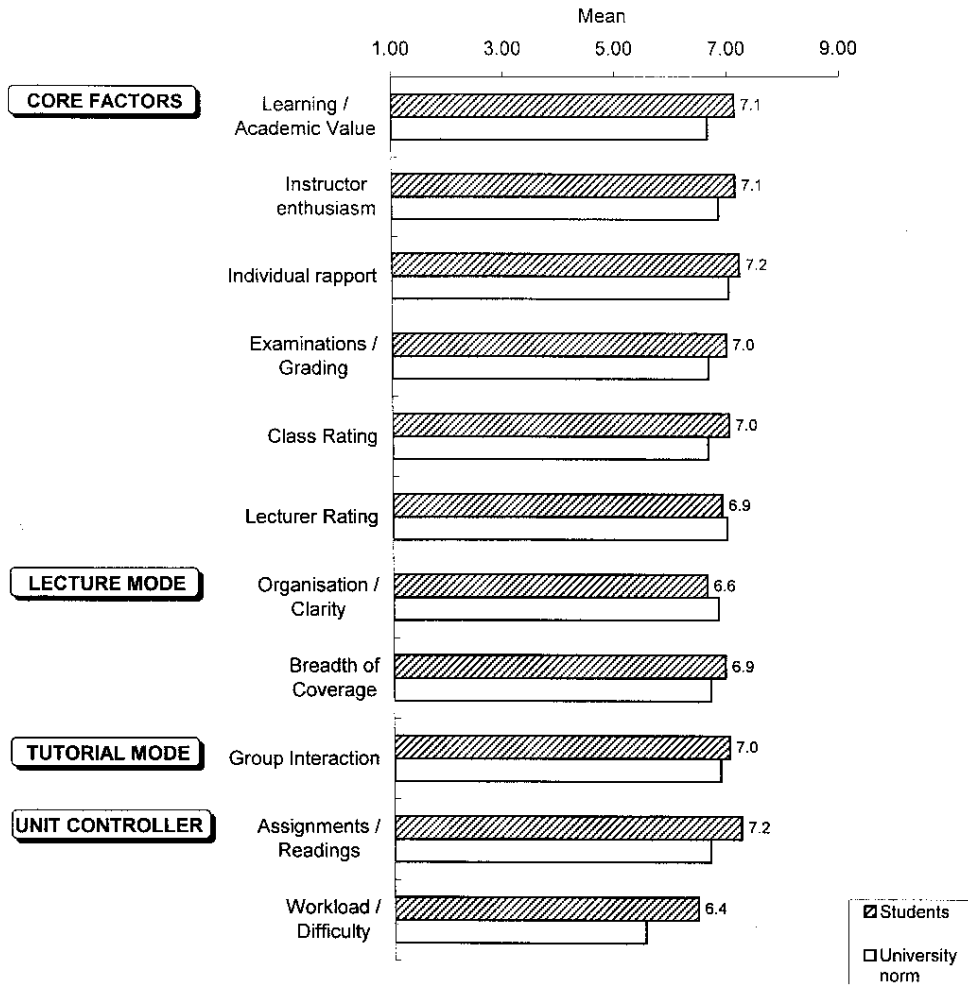
**It is very difficult for the LSN to produce additional copies of this report so please ensure you file it in a safe place! Should additional copies of the report be required there will be a cost of \$25**

**Student Evaluation of Educational Quality (SEEQ)  
Curtin University of Technology**

**Summary Report**

Subject: **Mechanical Design 335**  
Teacher: **Sam Cubero**  
School: **Mechanical Engineering**

Administered on: **6-Jun-03**  
No. students responding: **15**  
Percentage response: **100%**



Printed: 19-Jun-03

Reg# 716

**It is very difficult for the LSN to produce additional copies of this report so please ensure you file it in a safe place! Should additional copies of the report be required there will be a cost of \$25**

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## WEBSITE & ADDITIONAL INFORMATION

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At [www.samcubero.com](http://www.samcubero.com) you can find:

- “Teaching\_Mechatronic\_Engineers\_2006.pdf”: slideshow summarising successful teaching methods.
- “Reference\_Letters.zip”: testimonials and commendations from some students and colleagues (PDF files).
- “Subject\_specifications.zip”: subjects Dr Sam Cubero taught as examiner or assistant examiner/facilitator.
- Many fascinating YouTube demonstration movies of projects supervised or designed by Dr Sam Cubero.
- Personal views on mechatronic engineering education & research work and future opportunities.
- Brief summaries of past, present and future research projects and novel inventions.
- You can request a DVD disc containing high quality videos of past research projects and research papers.

All of the topics and subjects mentioned on this website can be taught immediately as University-level undergraduate or post-graduate subjects. Lecture notes, lab materials, tutorials, assignment / exam questions and solutions have already been prepared or can be quickly created for immediate teaching, covering all of the topics mentioned. Such material can be used to teach an EA (Engineers Australia) or ABET (Accreditation Board of Engineering and Technology) accredited degree course in “Mechatronic Engineering”, “Automation Engineering”, “Manufacturing Engineering” and/or “Robotic Engineering” to world-class or world-leading standards, and has been proven in the past to make positive impacts on research activity. e.g. providing advanced skills for students to conduct Ph.D or Masters research. The technical content and teaching methods that I use are similar to, equivalent to, or even better than what is used by the ‘best of the best’ robotics engineering schools in the world, namely: MIT, CMU (Carnegie Mellon University), Stanford and the University of Pennsylvania. I always strive to teach students the latest and most practical technologies, to prepare them well for their careers. In fact, some of my talented and hard-working students became so skilled and confident in their own abilities, they even started their own businesses and employed many graduate students! Some of them were even inspired to continue their studies as Masters and Ph.D research students.

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## CONTACT DETAILS

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[www.linkedin.com](http://www.linkedin.com) Search for the name: Sam Cubero

## CONCLUDING REMARKS

I believe that I can make a big positive difference in any teaching institution with my technical knowledge and effective teaching skills (which are rated by most students as 'above department average' ), in the same way that I had helped several very successful Curtin University students, like Joshua Portlock (the final year student I personally supervised and guided in his Final-year UAV drone project – the QTAR (Quad-Thrust Aerial Robot) - which was in fact the FIRST quadcopter UAV drone ever designed and built in Australia which could successfully hover in a stable manner and fly to any commanded position. The QTAR was built after several other Australian Universities attempted and failed to build a working UAV quadcopter). I taught Joshua in many of his Mechatronic Engineering subjects - I also taught him AVR microcontroller programming, serial communications, embedded software control algorithms, and many practical electronics skills. Joshua Portlock founded a technology company called 'Scientific Aerospace' – a UAV / drone manufacturing company. Please watch this short promotional video for Curtin University (in Australia, where I worked for 9 years):

<https://youtu.be/ou6XzHKlvQg>

I also taught other famous Curtin University students like Mr. Robert Reid (who now works at NASA, JPL, USA) - look up his profile at [www.linkedin.com](http://www.linkedin.com) or click on this link here:

<https://www.linkedin.com/in/rgreid/>

Here you will find videos demonstrating the kinds of skills that our graduate students have learned and used in advanced research projects. For example, Robert Reid worked on the NASA 'Hedgehog' jumping robot:

<https://www.youtube.com/watch?v=FPyVGRwegvU>

<https://www.youtube.com/watch?v=CM7zr9vOCbU>

In his final-year project at Curtin University, Robert designed, built and programmed a mobile robot that can drive around and create a 3D visualization - or 'point cloud' scan - of its surroundings, using sophisticated SFM (Structure From Motion) machine vision algorithms. He is currently working on designing and building high-tech devices for space applications, such as asteroid surveying and scanning systems, new machine vision systems and mobile robots for low-gravity space applications.

Also, I supervised Paul Deuchar - former CEO of Argon Robotics, CEO of [www.use-verb.com](http://www.use-verb.com) and also taught Glenn Richmond - CEO of CRM Online - data management software company. Many of my previous students became successful entrepreneurs, created new businesses, developed many new products and services, and several of them now even employ graduate students to support the local economy.

I was the one who first introduced AutoCAD, AVR microcontrollers, machine vision programming, motion capture, 3D programming, 3D scanning and graphics, Windows programming, UAVs and self-driving

autonomous mobile robot projects at Curtin University, making it one of the most practical and successful Universities in Australia for producing highly-skilled graduates who can BUILD useful things and create new products, novel inventions and new jobs (not just theoretical papers). It takes a lot of time and effort to learn and use new and emerging technologies, understand the theory and teach these technologies in such a way so that almost anyone can be an expert in these things - i.e. those who are willing to work hard!

For example:

Matchbox collecting competition I organized in 2005: <https://www.youtube.com/watch?v=5XCJC3RRZds>

Bottle collecting competition I organized in 2013:  
<https://www.youtube.com/watch?v=fcJXgBdzMqQ>  
<https://www.youtube.com/watch?v=rKYYm4BSq3M>

Smart gym final-year (senior design) project I supervised: <https://www.youtube.com/watch?v=pCnOz58B0Fs>

I also appeared in the Channel 10 News, Australia, "Robot Wars at Curtin University" story:  
<https://www.youtube.com/watch?v=ozs-2eTEyko>

Many other practical design-and-build projects can be viewed in the 'Example Projects' section at my website:  
[www.samcubero.com](http://www.samcubero.com)

In conclusion...

I am very successful at helping students to become prototyping experts, and proficient at learning, using and building new Mechatronics / Robotic hardware and technologies. I believe that my skills can be put to good use mainly in a 'teaching role'. My strongest skills are in teaching, setting up labs and demonstrating practical applications of Mechatronics and Robotics using the most modern technologies available.

I can design and build almost any new kind of product or hardware using conventional workshop tools. Several research projects I had developed in the past involved collaborative links with industries within my local region and a few research and development projects involved researchers from local and overseas Universities. Over the years, I have also applied for and won 3 different competitive research grants to fund robotics research projects, and I supervised several postgraduate research students in Australia (PhD and Masters students). I also enjoy supervising final-year mechatronic or mechanical engineering projects relating to the design and manufacture of new machines, robots and automation systems, many of which are useful to local industry.

Please read the PDF file: "Teaching Mechatronic Engineers":

[http://samcubero.cuberobots.com/MX\\_CV\\_Resume.html](http://samcubero.cuberobots.com/MX_CV_Resume.html)

Mission statement: [http://samcubero.cuberobots.com/MX\\_mission\\_statement.html](http://samcubero.cuberobots.com/MX_mission_statement.html)

Some student testimonials and sample YouTube videos can be found at [www.samcubero.com](http://www.samcubero.com)

Let me know if you want to read the latest recommendation letters from past supervisors (managers).

Also, the people in the following table of "References" are willing to provide comments about my past teaching and service achievements.

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**REFERENCES**

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<p>Dr <b>John Billingsley</b> Professor (Chair)                  PhD (Cantab) MA (Cantab) BA                  CEng CPEng FIET FIEAust SenMIEEE                  (also inventor of world's 1<sup>st</sup> laser printer)</p> <p><a href="mailto:John.Billingsley@usq.edu.au">John.Billingsley@usq.edu.au</a></p>	<p>Chair of Mechatronic Engineering, Former supervisor                  University of Southern Queensland (USQ), Australia.                  Director of Technology Research, National Centre for                  Engineering in Agriculture / NCEA (QLD)</p> <p><a href="https://staffprofile.usq.edu.au/Profile/John-Billingsley">https://staffprofile.usq.edu.au/Profile/John-Billingsley</a></p> <p>Tel: +61 7 4631 2513 (Brisbane time GMT +6 hours)</p>
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<p><b>Paul Deuchar</b> - ex CEO Argon Robotics                  Senior Consultant, Chairman</p> <p><a href="mailto:paul@deuchar.com.au">paul@deuchar.com.au</a></p>	<p>Former CEO of Argon Robotics (Western Australia)                  Former final-year student of Dr Sam Cubero, Curtin                  University of Technology, Perth</p> <p>(See his profile on <a href="http://www.linkedin.com">www.linkedin.com</a> )</p>