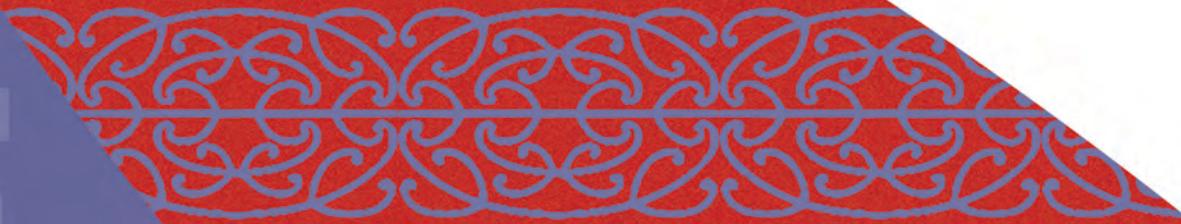


# 2018

Whakaaturanga Hanga Pūmanawa  
**Software Engineering  
Showcase**



UNIVERSITY OF  
CANTERBURY

*Te Whare Wānanga o Waitaha*  
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# Contents

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|  |     |
|--|-----|
| Welcome message .....  | iii |
| Nau mai ki te Whakaaturanga Hanga Pūmanawa mō te tau 2018! ..... | iii |
| Welcome to Software Engineering Showcase 2018! .....             | iii |
| About SE Showcase .....  | 4   |
| This year's project .....  | 6   |
| Schedule.....  | 7   |
| Photos/Video .....   | 7   |
| Abstracts.....   | 8   |
| Team 300 .....   | 8   |
| Team 200 .....   | 8   |
| Donaco.....  | 9   |
| Rubber Ducks .....   | 9   |
| Dr. MOE.....   | 10  |
| Big Pharma .....   | 10  |
| SapioCulture.....  | 11  |
| BloodBois.....   | 11  |
| Thanks To Our Sponsors! .....                                    | 12  |

# Acknowledgements

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As a year-long group project course, SENG302 has many specific requirements throughout the year. We would like to thank the many people that helped give our students the best learning experience possible.

Thanks to:

- ⦿ The Computer Science & Software Engineering Technical Staff for setting up (and maintaining) the equipment, hardware, software, virtual machines, etc. as we needed, and for helping with SE Showcase. Peter Glassenbury, Joffre Horlor, Adrian White, Steven Sykes, Phil Holland – thank you!
- ⦿ Lynleigh Morgan for helping organise the venue and catering for SE Showcase 2018. Also, for keeping the software engineering room bookings in order.
- ⦿ Alex Forster for the countless ways she has helped SENG302 for many years.
- ⦿ David van Leeuwen for single-handedly looking after Eng-Git, the Git (Source Code Control) server, and for making himself available to help with it on the many times we needed during the year.
- ⦿ Industry representatives who gave guest lectures/workshops and/or provided advice.
- ⦿ The Department of Computer Science & Software Engineering including all the staff, for supporting the specialised needs of SENG302 including events such as this and pastoral care of our students. It is great to be part of a close-knit department to provide a world-class learning environment for our students.
- ⦿ Our sponsors (see last page), without whom events such as this would not be possible.
- ⦿ The families, partners, relatives, friends, and support networks who have supported our students and provided encouragement during the year. This is incredibly important especially in long and challenging courses.

# WELCOME MESSAGE

Dear students, staff, family members, industry representatives, and members of the wider community,

## Nau mai ki te Whakaaturanga Hanga Pūmanawa mō te tau 2018!

He mihi ki ngā ākonga me ngā kaimahi o te whare wānanga, ki ngā māngai ahumahi me te hapori whānui anō hoki. E manahau ana mātou kua tae mai koutou katoa ki tēnei hui whakanui. Kua poho kererū mātou i ngā whakatutukitanga a ā mātou ākonga i te tau nei.

He mihi ki a koutou katoa i runga i ngā tini tautoko o te tau nei. Ko te ako he mahi ā-hapori, ā, me kore ake koutou e tautoko mai ana, he iti ake ngā hua ako.



## Welcome to Software Engineering Showcase 2018!

Towards the end of this academic year, we are again excited to celebrate the hard work and achievements of our software engineering group project course (SENG302) students. In SENG302, students spend a year working in a team within the larger SENG302 “organisation”, to develop a substantive piece of software. This is much harder than one might imagine and the lessons learnt through experience cannot simply be taught in lecture-based courses. They learn not only quantitative (technical) skills, but also the important qualitative/transferable (“soft”) skills.

SENG302 has quite a high workload, both for students and staff. This year, as in any other year, the students went through a rollercoaster of emotions as they critically assessed the situations and their own abilities, faced failures, became more self-aware, pushed past their limits, brought together all their learning from other courses to solve problems, and increased confidence in their own abilities.

We are very proud of our students’ accomplishments this year. We are very pleased that all of you are here with us to be a part of this celebration. We are also grateful for your support of our students at this event, and for some of you, right throughout the year. This includes our sponsors and industry representatives. Learning is a community activity and without your support, this learning would be limited.

So, thank you.

We hope you enjoy the day and get to talk with each of the students. They are our future!



Moffat Mathews

On behalf of the SENG302 teaching team:



Fabian  
Gilson



Miguel  
Morales



Marina  
Filipovic



Andrew  
Curtis-Black



Liz  
Richardson



Stefan  
Hall



Liam  
Beckett



Patricia de  
Andrade

# ABOUT SE SHOWCASE

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To understand the history of the Software Engineering Showcase, one needs to know a little bit about the history of the project course. The third year project course has been taught under various course codes using various methods over the years. However, a year-long project was taught at CSSE for a few decades.

*“A year-long project course ensures students understand what it is to live with the impact of their decisions, and to realise that their decisions may have follow-on effects, even months down the line.”*



Historically, most of the focus in the course was on the end product; the intent was that focusing on the end result would build and test the technical performance of the team. The side effect of this unfortunately, was that in reality, it meant that the quality of the product became more important than the learning gained by the team in the process. It promoted “hero culture”, where one or a few developers pulled the project through to completion by doing a heroic effort. Students who were less confident in their abilities did not step up and consequently learn, but instead they let those who seemed confident do the work. In terms of presentations/demos, it meant that students had only one presentation at the end of the year where the team presented their product to the class.

*“Software Engineering is a people-centric discipline.”*

Over the years, the field of software engineering grew and more process-oriented frameworks and methods were being used in industry to develop software. As in other fields, experts (software engineers in the field and occupational psychologists) discovered the importance of qualitative (“soft”) skills in software development projects. Various studies into project management highlighted the significance of human factors in the failure or success of software projects. We changed the project course to include these aspects. The course moved from more of an RUP (linear, waterfall) process to spiral (with iterations) to XP (agile methodology). With each change, more of the process and team skills were brought into the project course.



*“Continuous improvement requires regular reflection on one’s practice, actions, decisions, and the related consequences. Learning from mistakes becomes a habit.”*

Today, SENG302 students use the Scrum framework to develop software in teams. The emphasis now is not on the technical skills, which are still crucial for success in this course and are taught and assessed in other courses, but on

the skills required to build “larger” pieces of software over a longer period within a team of developers in the context of an organisation with stakeholders. Students have to learn to communicate and negotiate with people in various contexts (e.g. technical, business, and laypeople). They also need to understand the business’ strategy and help with prioritising and grooming the backlog. At every review (at the end of each sprint), teams do a technical presentation and demo their product to the rest of the class who actively provide feedback. Teams also conduct in-depth reviews of another team’s codebase. Team retrospectives at the end of each sprint enable students to reflect and make changes to continuously improve individually and as a team. Apart from the usual software deliverables each sprint, students also have to do in-depth self-reflections and provide feedback for all the peers in their team. The emphasis is on learning. Students learn to take ownership of their mistakes and use it as stepping-stones towards learning.

In 2006, Moffat Mathews with Neville Churcher and Warwick Irwin officially changed the final presentation to the Software Engineering Showcase. SE Showcase has had several changes over the years to reflect the purpose and goals of the presentations. The SE Showcase is now a public event, i.e. the teams need to communicate to lay and technical people. The SE Showcase is not a technical presentation (like those at the sprint reviews), nor is it a marketing presentation. At this presentation, the students present to the wider community (wider group of stakeholders), letting them know what they achieved in items they were tasked with over the year and what they learnt. Their achievements are not just the product, but their “personal portfolio” of skills required to work in a team. It is also a celebration of the fairly intense work and learning that each student goes through over the year. In our new format, we have shortened the presentations to make room for a session where the audience can mingle with the students, try out their products, and talk with them about their learning experiences.

# THIS YEAR'S PROJECT

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## **Product: An organ donation system to encourage people to donate organs**

The SENG302 project for 2018 focused on an organ donation system. In New Zealand, more than 550 people are waiting for a transplant of an organ/tissue. By transplanting healthy organs, lives could be saved and the need for long-term medical treatments could be lowered. Organ donations have the potential to give those in need a second chance at life and increase their quality of life.

Currently, when getting or renewing your New Zealand driving licence, you may register as a donor with your donor status noted on your licence. In 2018, more than half of New Zealanders having a driving licence were registered as possible organ donors. However, this amount is still considered too low. The NZ Ministry of Health has identified this gap and has put in place a national strategy to overcome this problem. The strategy targets key areas such as public awareness, media, donations, matching allocations, procurement, transport/delivery, transplant, and post-transplant care.

Unfortunately, there is also disparity in New Zealand with regards to individuals receiving (and donating) organs. Furthermore, issues such as organ and blood donation can have significant meaning, not only to those who require organs but also in light of customs, cultures, and beliefs. This requires discussions around this topic to include sensitivity and understanding.

Encouraging people to donate organs requires having a system where individuals feel like they have control over their donations. This includes easy registration with choice of which organs to donate, and the ability to change their minds easily and without penalty. To be useful, clinicians also need to be able to get information when organs become available. Most organs have a certain amount of time within which the transplant procedure needs to occur, putting an additional time pressure on clinicians. This means that clinicians need to know as soon as an organ becomes available, its location, and the number of hours it has before the organ becomes unusable. Ideally, they would also have some idea of the donor's history that may influence any decisions. For example, a donor may have registered to donate a heart but later developed a coronary disease. Certain medications and procedures may also influence transplant decisions.

Furthermore, when coordinating between donors and potential receivers, lots of constraints must be taken into account, like blood type compatibility, recipient priority (e.g. the time a recipient has been waiting for an organ), distance between the donor and receiver, and so on. All these constraints are often hard to sum up in an efficient and swift manner, so clinicians may need computer aided tools to help in their decision process when a transplant surgery must be planned.

In this project, the teams had to develop software where donors can self-register, those requiring organs can be entered by their clinicians, and where clinicians can search for potential matches.

Data privacy and security are highly critical in such a domain. In this project, the emphasis was put on increasing the awareness of this problem and creating an appealing software application with extended features.

From a common basis with a restrictive set of user requirements, the eight teams delivered very different and interesting pieces of software. Students learnt how to develop a professional product and add their own touch by proposing user stories, among others, graphical visualisations of donors in a certain geographical range, rewards for blood donation, mobile applications, or even a platform game to increase awareness/engagement and encourage donations.

# SCHEDULE

Date: Friday 12 October 2017.

Where: The Foundry UCSA Events Centre (off Ilam Rd), University of Canterbury

Chair: Liz Richardson

| Time         | Details                               |
|--------------|---------------------------------------|
| 08:30 - 0900 | Coffee and tea served                 |
| 0900 - 0930  | Introduction:                         |
| 0930 - 0945  | This year's project: Fabian Gilson    |
| 0945 - 1000  | Team 300                              |
| 1005 - 1020  | Team 200                              |
| 1025 - 1040  | Donaco                                |
| 1045 - 1100  | Rubber Ducks                          |
| 1105 - 1120  | Dr. MOE                               |
| 1125 - 1140  | Big Pharma                            |
| 1145 - 1200  | SapioCulture                          |
| 1205 - 1220  | BloodBois                             |
| 1220 - 1225  | Student Representative: Andrew French |
| 1225 - 1245  | Closing                               |
| 12:45 - 1500 | Lunch and interactive session         |

*Please note that this is the intended schedule. The start/end times might vary depending on various factors, such as the actual length of a presentation.*

## Photos/Video

Photos and/or video will be taken at this event. The official photos/videos will only be used for promoting the university and courses. Please let the event co-ordinator know if you do not want your photo taken so that the photographers can attempt to blur your face in the final product.

# ABSTRACTS

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## Team 300

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ANDREW DAVIDSON, ANDREW FRENCH, JONATHAN HILLS, MATTHEW KNIGHT, JAMES MACKAY, JAMES MORRITT, KYRAN STAGG, NICKY ZOHRAB-HENRICKS

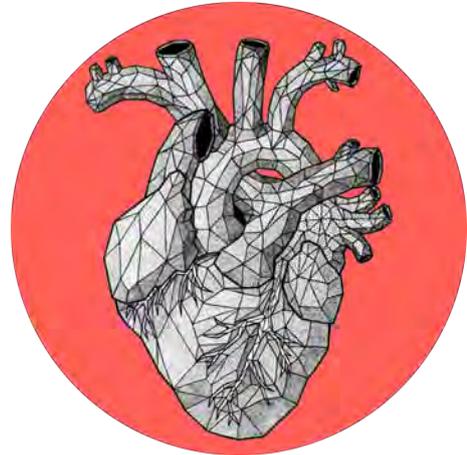
**TEAM 300** seeks to transcend the bounds of organ donation management through an ubiquitous mobile app paired with a reliable and effective cloud based API. **TRANSCEND DONATION** is an application designed to make organ donation more accessible to the public, and provide medical personnel with a more thorough approach at connecting available organs to patients. It features both desktop and mobile functionality, allowing users to constantly stay connected regardless of location.

With an intuitive map view, medical professionals can leverage the power of our comprehensive AI based algorithm to effortlessly pair organ donations to recipients; creating time for them to focus on the complex nitty-gritty at the hospital.

Once our algorithm has confirmed the ideal organ recipient, a clinician can track the position of the organ in real-time with our helicopter flight estimation overview.

Using state of the art technology, clinicians can keep users informed in real time using a secure message system. This gives patients the peace of mind they need so they can enjoy their day to day life, wherever they are on the block. Chaining this with instant push notifications means the user is always connected.

Powering these incredible features is a robust and extensible Web API that developers can securely interface with access to our wealth of information alongside numerous powerful micro-services.



## Team 200

---

ZACHARY BRAZENDALE, LACHLAN BREWSTER, TIMOTHY HAMBLIN, JACK HAY, MATTHEW KING, ALEX MILLER, BROOKE RAKOWITZ, LEWIS WHITE, JOSHUA WYLLIE

This application is an organ donation management system. It allows a user to register organs that they are either looking to receive, or willing to donate, and be matched up with potential receivers/donors. To do this, users create accounts and set up their profiles, customising their details.

Medical professionals can utilise this application to carry out the steps required to match a donor and a receiver for transplant. These users can achieve this by selecting a compatible donor and receiver on the interactive organs map, incorporated into our product through Google Maps. They can then use our procedure scheduling functionality to schedule the procedure for the compatible donors. This procedure scheduling allows real time organ management throughout New Zealand and the rest of the world. We have incorporated into the map New Zealand hospitals so that a procedure can be scheduled at a relevant location. This aids medical professionals in carrying out fast and efficient planning which is important as timing is critical to the health of the patients.



Our application also has an embedded social feed. The feed is automatically populated with tweets that contain certain hashtags. This allows users to share their positive experiences with other users of our organ donation management system and the world. It also provides a social aspect to the application allowing people to share their donations with other users of the application.

## Donaco

---

DYLAN CARLYLE, OLIVER CHICK, THOMAS KEARSLEY, MATTHEW SMIT, JACK STEEL, ALEXANDER TOMPKINS, JAMES TOOHEY, ELIZABETH WILSON

**DONACO** presents the latest ground-breaking development in life-saving organ transplantation. Focused on delivering a rich multi-touch interface for clinical staff to match donors with in-need recipients, **ORGANZ** is designed with collaboration at its core.

**ORGANZ** has been specifically engineered for use by several clinicians around a tabletop touch display, allowing for rapid decisions with intuitive touch controls. Each clinician may interact with multiple windows on the same display simultaneously, with zero interference and maximum cooperation. This unique interface provides a novel solution for scheduling organ transplants within a single linked “spider web” view, communicating critical information to the clinical team that enables them to make life-saving decisions rapidly and collaboratively.

**ORGANZ** is additionally backed by a full client-server architecture, allowing staff and patients to update information from anywhere, at any time.



## Rubber Ducks

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AARON BONG, JOSHUA BURT, JENNIFER HALVORSEN, TYLER KENNEDY, EIRAN LING, JAMES REGAN, ALANNA REID

Donating organs is hard. It's hard to find out if you are eligible and it's hard to know where to start. **SECOND HAND ORGANS** aspires to make the entire organ donation process easier for everyone.

Through built-in timetabling, communication between public users and clinicians is made simpler, allowing for fast responses and notifications. Additionally, a clinician's job becomes easier to manage, as they can view large quantities of donated organs and their potential recipients in an instant.

**SECOND HAND ORGANS** also provides public users with the ability to view the progression of their blood test results, allowing them to easily track their health progress and make the most out of life.



## Dr. MOE

VERNON CUIPERS, KIRILL KIRILLOV, PATRICK MA, CONNOR MCEWAN-MCDOWALL, RYAN ONG, OSCAR STOCKILL, LUKE WOOLLETT, HELEN YANG

**DR. MOE** is an organ donation management system that aims to make it easier for the public to register their intention to donate organs. Furthermore, it makes notifying clinicians of available organs a simpler process by providing an inter-hospital communication platform. This enables clinicians to notify other hospitals that have patients in need of a particular organ when one has become available.

Through **DR. MOE**, patients are assigned to and looked after by a registered clinician. Using **DR. MOE**, clinicians are able to chat with other registered clinicians within New Zealand and organize where needed organs should go. The interactive map of all New Zealand hospitals built into **DR. MOE** aids clinicians in this process, giving an indication of travel time between different hospitals. Donors that pass away will have their organs available for transplants within their hospital. For any unneeded organs at a hospital, a notification about their availability can be sent by the clinician to other reachable hospitals.



## Big Pharma

KYLE LAMB, PATRICK LAFFEY, JOSHUA MENEHINI, MAREE PALMER, AIDAN SMITH, ANDREW SPEARMAN, HAYDEN TAYLOR

**BIG PHARMA**'s application enables the interaction between patient data and multiple clinicians on a large touch table. This involves multi-user touch support, allowing multiple clinicians (up to 10 simultaneous touches) to work collaboratively. Clinicians can register, modify, and assign organs between patients using full touch functionality. Clinicians can pass panes between one another using a simple throwing gesture, as all panes have built in momentum. This makes it easy to exchange information around the touch table without having to walk around it. Alongside the touch table, **BIG PHARMA**'s application can run as a standard desktop program where users can register as a patient and clinicians can manage organ transplants.



The clinicians and administrators are presented with a large map which can be interacted with using touch gestures. This map can display any set of patients that the clinicians need to view, with each patient's donation information being accessible. Selecting an organ for a patient shows an expiry radius on the map for an organ, making it easier for clinicians to make assignments by displaying how far an organ can be transported before expiring. Organs that are already assigned are shown as lines between patient markers on the map. By clicking on a patient, a clinician can view other patients which have organs assigned to that patient, even if they were not originally loaded on the map. All expiry details are shown in real time via the radius on the map and the progress bars on the available organs screen.

# SapioCulture

---

CAMERON AULD, ALAN BROOK, ROBERT BRUCE, REBECCA COX, TIMOTHY MCKENZIE, IMAS NEUPANE, BENNY SCHMIDT, LUCY TURNER

**ORGAN DONATION ANALYSIS SYSTEM (ODAS)** is a Java-based desktop application developed by **SAPIOCULTURE** that is targeted towards medical personnel as well as their patients. ODAS aims to bridge the gap between those in need of organ donations and those who are willing to donate organs. An extension of this is through statistical analysis showing both regional and nationwide trends on donations.



ODAS provides support for patients to register organs that they wish to donate, and keep track of their relevant medical information. For medical personnel, **ODAS** places emphasis on the visualisation of organs being donated or received. These graphs can be sorted in a multitude of ways including, but not limited to, organs donated by region, blood type and gender. Data used for visualization is collated anonymously to maintain patients' privacy. This is all encompassed in a new and improved interface, which allows the user to easily navigate through the many features in the application.

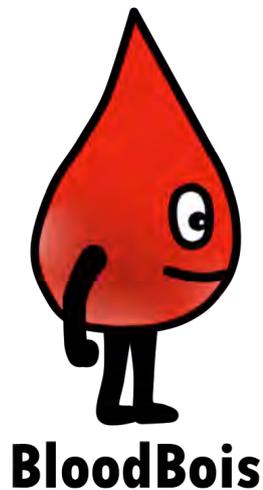
# BloodBois

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BRADEN ALSFORD, JOSHUA BERNASCONI, MORGAN ENGLISH, COURTNEY HOSKIN, MATTHEW JOLL, KEVIN LANGBROEK, EOGHAN ROBERTS

**BLOODBOIS** are pleased to present Donation Station; a new medical tracking application for the lower North Island of New Zealand. It challenges the expectation that a professional, clinical application is unintuitive and unappealing.

**DONATION STATION** prioritizes the user's enjoyment; promoting registering as an organ donor and donating blood regularly. After performing tasks within the application, users are awarded points which they can use to compete with other **DONATION STATION** users. Users earn achievements by performing significant tasks like signing up with Facebook or donating blood plasma for the first time, giving them extra points to fast-track their way to the top of the leaderboard. The most notable leaderboard is for blood donation, shown with 3d visualisations, where regions compete for the position of top donors over a period of time. Users can share their in-app progress to the real world through Facebook sharing. Finally, the **ADVENTURES OF BLOOD BOI** is a game where users can try their skills and experience blood donation in a truly unique way. Through earning achievements, users are rewarded with additional levels and game abilities.



## THANKS TO OUR SPONSORS!

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If you would like to be a future sponsor for CSSE events, please contact [admin@cosc.canterbury.ac.nz](mailto:admin@cosc.canterbury.ac.nz).

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