Microscopy in Focus

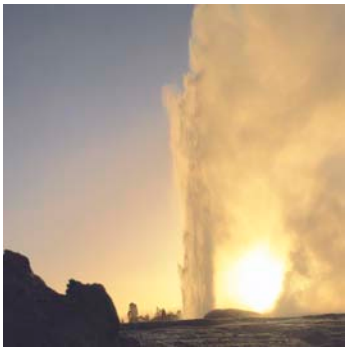
Newsletter of Microscopy New Zealand Inc.

Issue 18 ISSN 1174-0949 August 2008

Conference Countdown

Another year marches on faster than ever. It means either we're all getting old or we're having more fun at work than we're paid to have? With many people bogged down in grant applications, teaching and fighting battles of survival, it's sometimes easy to forget it's often the arcane art of microscopy which keeps us enthusiastic.

The 24th New Zealand Conference on Microscopy will be held at the Distinction Hotel in Rotorua from 10 -12 February 2009. Registration will open in July 2008 with an early registration deadline of November 1st 2008. The conference will include a trade display, pre-conference workshops on the 9th of February, and a number of opportunities for social activities including a conference dinner, and breakfast in the world famous Redwood Forest (mountain bike optional).



Rotorua is New Zealand's premier tourist destination with geothermal, fishing, mountain biking and adventure activites. Rotorua is a small city of 70,000 people on the shores of Lake Rotorua. It can be accessed by direct flights from Auckland, Wellington or Christchurch, and is a comfortable three hour drive from Auckland.

The conference venue, Distinction Hotel Rotorua, provides a pleasant garden atmosphere with newly renovated rooms and spacious conference facilities. We look forward to meeting you next summer in Rotorua.

Contact Lloyd Donaldson at scionresearch.com, 07 343 5581 for further information or visit the conference website at http://www.microscopynz.co.nz/NZCM2009/home.htm

News from the President

Dear Microscopy NZ members

If you didn't make it to the Perth Conference, Microscopy N.Z. Inc. is keen to organise one or more summer workshops around the country. This could involve hands-on training or a tour by an expert speaker. If anyone has some flash new equipment they would like to demonstrate to potential users or if there is a topic you would like to hear about let us know. Microcopy N.Z. Inc. may be able to provide financial/ organisational assistance.

And finally, just a reminder to submit articles or news items for the next issue of "Microscopy in Focus" to: andrew.mcnaughton@stonebow.otago.ac.nz.

Regards
Dr Lloyd Donaldson
President, Microscopy NZ Inc.

Contents

Asia Pacific Congress on Electron Tomography

Microscopy NZ is pleased to announce that Mike Jennings of Otago University has been awarded MNZ funding to attend the APCET meeting in Brisbane in February 2009. Mike is a PhD student at Otago studying *"3D Ultrastructural Modelling of Connective Tissue Primary Cilia using Electron Tomography"* under the supervision of Associate Professor Tony Poole. Mike plans to present a poster at the conference and says "Attendance this conference would provide several opportunities to benefit my research. Firstly, as a new PhD student this meeting would be an opportunity to get feedback on my new research in this field. Secondly it would enable me to gain vital interactions with other scientists researching with electron tomography. Finally the proximity of this international meeting to New Zealand is a great opportunity to meet world leaders in this field." As a condition of this funding Mike will write a report on the APCET meeting for Microscopy in Focus and hopefully we will also get to see his poster at the Rotorua conference in February.

Editor's Note

Feedback from the previous issue has been encouraging with regards to the electronic only version. The biggest hurdle is now inspiring members to contribute content. It's never a pretty sight when an editor has to resort to pleading, so avert your eyes if this may disturb you.

Without a variety of content there is no incentive to pick up Microscopy in Focus and read it. Despite the best efforts of a few contributors it's a constant struggle to fill the pages with interesting, useful and entertaining content. A contribution doesn't have to be long and involved; a useful tip or even pointing readers to an interesting article are all good to receive.

Even if you're not keen on writing an article, suggestions on what you would like to read about would also be useful. Feedback on what you like, or don't like, about Microscopy in Focus is also beneficial, so don't hesitate to make contact.

Andrew McNaughton

Editor
Otago Centre for Confocal Microscopy
University of Otago

Obituary

Maria Luz Paje, PhD

Confocal Applications Scientist
Olympus Australia

I met Dr Luz Paje in December 2006, when I attended a Live Cell Imaging workshop at Monash University in Melbourne. Luz was there running the Olympus FCS/FLIM confocal system as part of the course.

We got to know each other in February 2007, when she came over to assist me with the fluorescence labelling and live cell imaging workshop that I had organised for Microscopy 2007, the 23rd New Zealand Conference on Microscopy, in Auckland.

We had communicated by telephone and email a number of times before she came over and from that, I had confidence that we were going to get along just fine. She had plenty of confocal expertise, having worked for Bio-Rad Laboratories prior to her employment with Olympus Australia. Since she was a research scientist, she was well-suited to the role that she had and her experience was a huge bonus for those of us lucky enough to draw on her expertise.

Receiving a high achievement award at Olympus's annual sales' conference April 2007.

Poor Luz had drawn the short straw to quickly take up Olympus's commitment to help with our conference! So, Luz was delegated to come forth to NZ to help us out. I had foolishly decided to do two workshops back to back on the same day to accommodate more participants so I was very grateful to Luz and also to Dr Lavinia Taliana from Invitrogen, for agreeing to help me out. Strangely, it turned out that Lavinia had been an Honours student in the same research group as Luz! This made for a great team.

Luz took it all in her stride and just kept telling me "Don't worry. It'll be fine". I was stressed out to the max with doing trials of the experiments and making sure that everything was on track for the day.

However, everything went well. In fact, Luz was so encouraging to all the participants in the workshop (even letting them run the microscope!), that after the first run of staining in the lab, they all voted to stay with Luz and concentrate on the imaging aspects rather than stain cells. So, I ran up and down stairs with the preparations, while Luz wowed everyone with the machine. Her relaxed manner and friendly personality really helped to make the workshops enjoyable and I think everyone appreciated her style of teaching.

Luz was a great advocate on our behalf and I really appreciated her efforts for us, especially since I had only recently taken over the management of our Olympus FV1000 confocal microscope so I still had plenty to learn.

I found out that Luz was a keen supporter of public transport, sometimes to the consternation (and amusement) of her colleagues. People would call her up on her mobile phone to find that Luz was sitting on a bus or train happily working on her laptop on her way to help out with a microscope.

Luz told me that whenever she went home to the Philippines, she always went back to the University of Philippines, where she had obtained her degrees, to check out the state of the microscopes and make sure they

were all performing well. She considered this an important role and something that she could contribute even though she wasn't living there anymore.

I heard recently that Luz was also instrumental in raising the funds to publish the first unbiased baby book at the Philippines General Hospital. Additional funds were used to provide basic medicines in the neo-natal care ward.

With friends and colleagues.

I couldn't believe it when I heard that Luz was ill with cancer and especially that it was so advanced. Luz was in her early forties and so full of life, it seemed inconceivable. Sadly, the progression of the illness was very quick and Luz passed away at around 11:50pm on February 12, 2008. Her family were with her at the Mt. Druitt Hospital. Luz leaves behind a husband, Jonathan Sibala, and her young daughter Julian.

I know all of us who knew Luz, both professionally and personally, will really miss her. I feel that Luz was the kind of person that you couldn't help but like and she made you feel comfortable about asking any question no matter how basic it might have seemed. Her passing is a great loss.

Jacqueline Ross
Biomedical Imaging Research Unit
University of Auckland

From the History Books

Ernst Ruska and the Transmission Electron Microscope

Transmission Electron Microscopes (TEM) are essential to so many research projects that any respected university is expected to have one in its arsenal of equipment. So much so that it's easy to forget the first TEM was only built in 1931 by Ernst Ruska and his tutor Max Knoll. Initially, the TEM had a less impressive resolution than light microscopes of the time, but by 1933 had surpassed them. Ernst Ruska took the theories of electron optics and turned them into a tool used by thousands of researchers across the world. Eventually being awarded the Nobel Prize for Physics with Max Knoll in 1986.

Ruska soon realised it would be industry, not universities, which had the resources to develop and construct a TEM. Consequently, he began work with Fernesh Ltd. in Berlin between 1933 and 1937 where, amongst other things, he developed television technology. For researchers in the 1930's, microscopy was limited to the wavelength of light. With the benefit of hindsight it's easy to suggest illuminating a specimen with electrons to greatly increase resolution, but consider the time at which these developments took place. Electrons as a form of wave motion was only proposed in 1924 by Frenchman Louis de Broglie. This was a time when many of the technologies we consider everyday were yet to be developed beyond a rudimentary level.

It was one thing to theorise how electrons would greatly increase the resolving power of a microscope, quite another to build the apparatus to do it. The cathode ray tube contains the fundamental elements of the electron microscope: a controllable beam of electrons, a viewing screen and a vacuum system to allow it to happen. It was however an impressive link to make, considering the primitive understanding of the technologies involved.

To control and focus the electron beam required the development of electromagnetic lenses, essentially replicating the focussing and aberration corrections already well developed in light microscopy. Again, the solution seems obvious to us, but these presented considerable technical challenges. High vacuum systems needed development along with methods of preparing, controlling and introducing the specimen to the microscope.

Max Knoll and Ernst Ruska. Image reproduced with the kind permission of the Ernst Ruska Archive. http://ernst.ruska.de

Siemens owned the patent on the TEM and produced the first commercial instrument in 1939, although it has been argued the first practical TEM was produced in 1938 at the University of Toronto. Initially, biological specimens were unable to be viewed using TEM as methods had not been developed to stabilise and contrast them under the TEM's viewing environment. Again it's easy to lose sight of the complexities of staining and sectioning biological material. To reach a very basic level took a great deal of technical skill and at times hazardous ventures into the world of heavy metals. It wasn't until the 1950s that staining methods were developed sufficiently to enable viewing of biological specimens. It was Ernst Ruska's brother, Helmut, a medical student, who encouraged the use of TEM in biology. From this point on it was biologists, rather than physicists, who drove developments in the field. Even today staining and fixation methods are being refined and argued over. The development of immuno-gold labelling opened up new areas of interest in TEM, as have more recent developments in tomography. Cryo-TEM has it's own challenges and is yet another area of specialisation which has extended the application of TEM. As a technique it has grown far beyond what Ernst Ruska could have dreamed of. Ernst Ruska died of cancer in 1988 after a long and illustrious career.

Finally, the success of TEM, particularly in biology, is heavily dependant upon specimen preparation. Without the development of fixation protocols, embedding and ultra-microtomes the use of TEM in biology would certainly have been extremely limited. The lure of TEM perhaps explains the motivation behind the long and torturous paths associated with specimen preparation. It pains a light microscopist to admit it, but TEM is a hard act to beat.

Andrew McNaughton
Otago Centre for Confocal Microscopy
University of Otago

What could go here ...

... anything you like. If you can write two sentences then this space could be yours.

Freeze Fracture in Otago

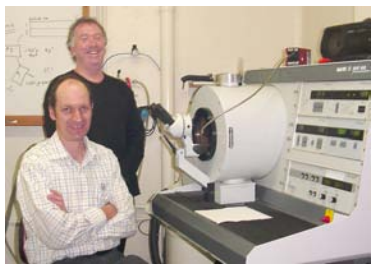
The OCEM recently acquired a Baltec BAF 060 freeze fracture machine. This device was previously housed at Fonterra in Palmerston North. Following the generous offer of the equipment to Otago in 2006, negotiations between Fonterra and University of Otago proceeded at a leisurely pace. In late 2007 the paperwork was completed to both party's satisfaction and all that remained was to shift the tonne of delicate equipment 800 km down the road.

Prior to the equipment being sent, I visited Fonterra in October 2007 and, with the help of Liz Nickless, found and collected the many tools, spares and consumables associated with the device. The workshop staff at Fonterra couldn't have been more helpful in moving the equipment across the campus, into the loading bay and safely packaged it into two purpose-made crates.

The crates arrived at Otago in January this year and we unpacked them outside in the car park and moved the gear into the OCEM. The quality of the packing ensured that the BAF 060 arrived undamaged and it ran with very few problems. It is a substantial and beautifully made machine.

Freeze-fracture has a long history at Otago and the arrival of this equipment allowed us to finally dispose of our old Baltec BAF 300 freeze-fracture device and resume the technique in earnest. Our BAF 300 was purchased in 1970 by David Rayns (Department of Anatomy, Otago) and was used by David, with support from Allan Mitchell and Mark Gould. This equipment was occasionally used to prepare specimens for the Dairy Research Institute (now Fonterra) in Palmerston North as part of their food ultrastructure research. In the mid-1990's it was recognised by the Dairy Research Institute that there was a need to have local access to freeze-fracture at Palmerston North and so funds were obtained to purchase the latest model, the BAF 060, in 1995.

Tony McKenna and Robyn Hirst at Fonterra undertook their research into dairy products using the device. Eventually demand for the technique at Fonterra declined, particularly after both those staff left. In the meantime, the BAF 300 at Otago had become obsolete and reached an exceedingly temperamental old age, 30 years of steady use having taken its toll. Therefore, when Fonterra offered the relatively new BAF 060 to the OCEM (subject to future access to the equipment), we eagerly accepted.



Allan Mitchell, Richard Easingwood and the BAF 060

Although freeze-fracture is a mature technique in many respects, there are new developments and applications. Freeze-fracture cytochemistry is an example of these new developments we are keen to try at Otago (see references).

The BAF 060 has already provided useful and encouraging results and I would like to thank Fonterra for providing this equipment. The BAF 060 promises to be a very useful additional resource to users of the OCEM. We are keen to facilitate its use by as many researchers as possible in the coming years so please contact us if you have project you think might benefit from freeze-fracture imaging.

Cytochemistry references:

Severs, N.J. Freeze-fracture Electron Microscopy http://www.nature.com/natureprotocols (Published online 22 March 2007, doi:10.1038/nprot.2007.55)

Robenek, H. et al. Adipophilin-enriched domains in the ER membrane are sites of lipid droplet biogenesis. J. Cell Sci. 119, 4215–4224 (2006).

Robenek, H. et al. Butyrophilin controls milk fat globule secretion. Proc. Natl. Acad. Sci. USA 103, 10385–10390 2006).

Robenek, H. et al. Lipid droplets gain PAT family proteins by interaction with specialized plasma membrane domains. J. Biol. Chem. 280, 26330–26338 (2005).

Richard Easingwood
Otago Centre for Electron Microscopy

Obituary

Charles A. Garbor PhD

Charles (Chuck) Garbor was the founder, President, and CEO of Structure Probe Inc., Chuck died after a brief battle with pancreatitis. He was 66. Dr. Garber was born in Rock Island, Illinois, to Morris and Evelyn Garber. He earned his undergraduate degree from the University of Illinois, Champaign, in Chemical Engineering. A 1967 graduate of Case Institute of Technology, Dr. Garber was world renowned for his work in electron microscopy and polymer physics. He is survived by his wife, Violet; mother, Evelyn; sister, Naomi Strauss; and his brother, Melvin Garber.

Summer Microscopy Symposium 2008

Microscopy New Zealand presented a summer microscopy symposium on Thursday 21st February at Auckland University, with Otago and Canterbury groups connected remotely by video conferencing. Taking advantage of the proximity of several international speakers and welcome support from Olympus NZ Ltd (lunch – thanks Karen), Coherent Scientific (cookies – thanks Melanie) and the Auckland University IT group, the day went extremely well and everyone had a great time. Thanks also to Jacqui and Hilary for organising the venue. For those who missed out here is a summary of the presentations.

John Mansfield - An Overview of a Range of Studies in Materials & Biomaterials

The University of Michigan Electron Microbeam Analysis Laboratory is the central user facility for all of the university's nanoscale chemical and structural characterization. It serves a wide range of research across campus, from over two dozen departments, including Chemical, Materials, Biomedical, Electrical, Mechanical and Nuclear Engineering, Physics, Chemistry, Biology and Geology and Orthopedic Research, Radiation Oncology, Pharmacology and Hearing Research. EMAL also serves other local universities in Southeastern Michigan, Northern Ohio and Southwestern Ontario in neighbouring Canada. The facility has over 400 active users and 14 major instruments split over two separate laboratories, one located in Materials Science and Engineering and one located in Geology. Although, when it was initially established in 1978, EMAL was predominantly an inorganic materials laboratory, developments in bioengineering and biomedical sciences have seen research activities move toward more soft materials and the study of inorganic-organic materials interfaces. This presentation summarized recent projects that are active in EMAL, concentrating on nanotechnology, bioengineering and energy research which constitute three of the University's contemporary major research thrusts.

Peter Ingram - Advances in Biomedical Microprobe Analysis

Biomedical Microprobe Analysis (BMA) refers to the acquisition and analysis of compositional data at cellular and subcellular spatial resolutions using microbeams on the nanometer scale. This is only one aspect of a very broad field of scientific inquiry that generally falls under the rubric of compositional imaging. Imaging can involve many different sources of radiation including electrons, ions and photons, including hard x-rays from synchrotron sources. Indeed there are often subtle distinctions in biological microscopy between "structural microanatomy" and "chemical microanatomy" - they obviously can be significantly different, for example during the early stages of cell injury when changes in the elemental distribution within a cell can become readily apparent before any changes are observed in morphology via “conventional”

microscopy. This talk focussed on the experimental procedures necessary for implementing correlative studies between disparate techniques as well as describe examples of BMA in both research and clinical settings.

Carola Thoni - Leica TCS STED Superresolution Microscope & Leica FLIM

Stimulated Emission Depletion Microscopy, or STED microscopy, is a method that overcomes the diffraction limit of conventional fluorescence confocal laser scanning microscopes and fluorescence widefield optical microscopes by reducing the active area of a pulsed excitation spot by a superimposed, pulsed and tightly synchronized ring-shaped beam, which depletes fluorescence before it is emitted. As a result, STED microscopy approaches molecular resolution, which offers breakthrough potentials for almost all aspects of bio-medical research. STED microscopy was invented by Prof. Stefan Hell of the Max Planck Institute for Biophysical Chemistry, Goettingen, Germany. With this invention, he won the German Future Award 2006. The principles of STED microscopy are licensed for commercialization to Leica Microsystems CMS GmbH. In 2007, Leica Microsystems introduced a commercial STED system based on the Confocal and Multiphoton System Leica TCS SP5.

Fluorescence life time imaging is an interesting method to gain information about the interaction of molecules and their environment. The lifetime of a fluorochrome is characteristic and can help to differentiate between molecules which have the same emission. Some application examples were presented.

Ann LeFurgey - Structural and Chemical Microanatomy: Preservation Protocols for Microscopy and Microanalysis

A major objective in preparation of biological specimens for microscopy and microanalysis is to stabilize cell structure and composition as they exist in the living state. Such preservation of hydrated living cells or tissues demands more rapid means of specimen stabilization than oxidizing chemicals, organic solvents and (potentially) carcinogenic resins achieve. Experimental approaches which are concerned with measuring and localizing diffusible substances unambiguously require the application of cryopreparative techniques. For example, quantitation of freely diffusible ions within cells or subcellular compartments by electron or X-ray probe X-ray microanalysis, secondary ion mass spectrometry, or laser microprobe mass analysis all require cryotechniques to instantaneously stabilize chemical constituents as they exist in vivo.

By definition, cryofixation or instantaneous lowering of cell temperature stops all metabolic and diffusional processes and significantly reduces molecular transformations. No chemical fixatives, solvents or embedding media can be employed at any stage of preparation. This process involves optimization of (a) the rate of cryopreservation relative to the rate of the metabolic, structural or physiological process under investigation; (b) the physiological and biochemical requirements for *in situ* maintenance of cellular constituents prior to, during, and subsequent to, cryofixation; (c) the type of cryofixation (cold metal block freezing, plunge freezing, jet freezing, spray freezing, high pressure freezing), cryosectioning and freeze drying for a given cell/tissue configuration and geometry; and (d) the criteria for assessment of cryopreservation and cryosection quality. Exceptions exist: insoluble crystalline deposits and covalently bound elements may be qualitatively preserved by a combination of rapid freezing, freeze substitution and chemical methods. To date there is no single ideal specimen fixation protocol which meets all the requirements for preservation of structural and chemical microanatomy of every specimen. However a flexible general strategy can be employed to develop rigorous preparative and analytical procedures which are optimum for each cell/tissue system and hypothesis to be tested.

Bernard Barry - Elemental microanalysis using nuclear microscopy

Nuclear microscopy is a highly sensitive and quantitative analytical method for elemental analysis

with imaging capabilities, which provides elemental concentrations down to ppm level (µg/g of dry weight) with a spatial resolution of 10-20 µm. It uses a focused high-energy ion beam obtained from particle accelerators combined with various analytical techniques. At GNS Science, we have established a nuclear microscopy facility to characterise a wide range of elements in many kinds of sample. For example, we probed the distribution of Cu, Fe and Zn in animal liver, kidney and heart tissue samples. We also measured Sr and Ca in otoliths (shell-like structures in fish ears) to determine whether or not native NZ fish such as Inanga spend their larva in the ocean. Further, we determined elemental concentrations of Cu, Cr and As in treated timber. Li, B and Cl have been measured in fresh volcanic rocks from Taupo. Recently we also investigated the uptake and distribution of various elements by brine shrimp from meteorites.

Details of the nuclear microscopy technique and sample preparation in a wide range of applications were presented.

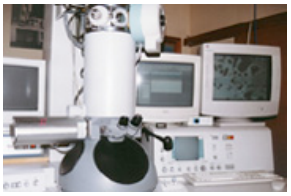
Service Contracts

To buy or not to buy? That is the question. The first year or two after purchasing a piece of major equipment are certainly the honeymoon period with regards to repairs. That warm feeling when a laser explodes or a vacuum system sprays oil through your microscope comes from knowing the supplier will remedy the fault at no cost to you. The only casualty being the company's profit margin.

The quandary is a service contract can seem very expensive for new equipment when few faults are expected. On an older instrument the usefulness of a service contract may increase, despite struggling to justify it if the equipment's book value is approaching zero.

The value of a service contract is often more subtle than simply being on a company's favoured call out list. Regular contact with service personal pays dividends solving unusual, but not necessarily calamitous, faults. Good service engineers can point out many tips not found in the manuals and are generally enthusiastic to discuss the features, or quirks, of a system.

When weighing up one manufacturer against another it is often difficult to decide simply on instrument specifications. If comparing apples with apples, there is often little between instruments other than personal familiarity. The factor which dictates the useful life span of your equipment is likely to be the service and support you receive. If this means buying into a service contract then it may be money well spent. The other option is to put aside a war-chest to pay for call outs when needed. Depending upon your financial environment, your war-chest may, or may not, be intact when battle commences. Raiding parties abound. Service contracts are a balance between the value of the equipment in the long-term and the difficulty of spending increasing sums of money on equipment which is increasing in age. Sudden death of equipment and a distant relationship with the supplier may however cost you more in the long run. Your call.



Issue 2

EM news

No 2 JUNE 1979

Editorial Comment

Herewith EM News No. 2. Yes we really were serious about continuing these short communications to EM'ers! Already it has acted as a focus for both regional meetings and national events. We have been delighted with the response we have received from people all over the country, it makes all the hard work worthwhile. As promised, this issue contains a user and equipment list. This has been very difficult to prepare especially when EM'ers forget to send the necessary information back to us, and for this reason there may still be mistakes or ambiguities in the listings. We apologise for this and with your help will correct it when the list is next published. We trust, however that the information in this list will be helpful and informative especially to those of you wanting information on equipment.

It has been especially pleasing to see both the Christchurch and Dunedin groups meeting just prior to our deadline and sending us so much information. Thank you.

In this issue you will find information received by Prof. Bullivant from the IFSEM and the RMS. This information is worth reading and discussing amongst yourselves. It would seem that the advantages of forming an Incorporated Society are many. Could we encourage you to discuss this matter at a regional level prior to the next EM conference so that a decision can be made at that time.

Alan Craig,
Garry Leet.

Resin Coated Photographic papers

A number of EMers have written us concerned about the phasing out of "non-plastic backed" photographic papers and their replacement by resin coated papers. We have contacted a number of photographic suppliers and they all have a similar response - eventually all photographic papers will be of the resin coated type. This applies to both the stabilization type of papers and the normal dish type. There may, however be one glimmer of hope for those who prefer the non-plastic papers; customer demand! If enough users wanted to keep using these papers we could indicate our concern to the manufacturers via their agents. Some stocks of non-plastic stabilization papers are still carried in NZ by H.E. Perry and Agfa-Gevaert and Ilfobrom paper is still available from Perry's in single weight glossy.

Garry Lect,
MIRINZ,
Hamilton.

Freezing System FC4 after H. Sitte

The FC4 cryo-chamber is designed for use with the Reichart "Ultracut" and carries on the well proven shell construction principle of thermally and mechanically insulating the knife holder from the outer chamber. The newly developed cooling system was liquid nitrogen and ensures good temperature stability of the knife and specimen and low nitrogen consumption. The cryo-chamber is surrounded by a twin tank which holds sufficient coolant for 20 mins operation, enough for several normal sectioning cycles, while an optional automatic refilling device allows uninterrupted working cycles for more than 10 hours. A new bridge-type specimen holder avoids all sealing problems of the specimen arm and provides improved thermal insulation between the low temperature specimen area and the arm and feed mechanism.

The triple mantle construction of the cooling chamber with its liquid nitrogen flow between the heated outer skin and the insulation mantle eliminates frost build-up on the outside of the chamber. The knife and specimen also remain frost-free due to other parts inside the cryo-chamber being at a lower temperature. The Reichart back-lighting together with a special knife holder simplify the alignment of the knife with the specimen.

The temperature of the knife and the specimen can be controlled between 0-160°C independently and the actual temperature of both the knife and the specimen can be read off on respective meters. Once the desired temperature is reached it is maintained in a steady-state whilst light emitting diodes on the control unit inform the user about the amount of liquid nitrogen still available in the twin tank and the operation of automatic refilling.

Selby Wilton Scientific Ltd,
P.O. Box 31044,
Lower Hutt.

Latest NZ SEM

Since its installation in December 1978 the shiny new JSM-35c Scanning Microscope at DSE in Auckland has accumulated approximately 200 hours of filament use. This is about long enough for the operators to obtain some idea of the general performance of the animal. For anyone accustomed to the aggressive routines required for operating first and second generation SEM's, the JSM-35 offers marked improvements both in terms of operating convenience and ultimate performance. The -C version of the JSM-35 provides one or two additional items of new technology such as digital and alphanumeric information displays which make life even easier.

The standard magnification range of the microscope is x10 - x180,000 and with a normal resolution limit in the secondary electron mode of about 100 A it is possible to routinely obtain good quality photographs at up to about x20,000. An all new backscattered electron device offers considerable gains and provision has also been made for use of a Kimball-type LaB_6 electron source. Preliminary signs are that in spite of having a mind of its own when newly installed, this latter gadget should provide a useful performance advantage.

So far the reliability of the microscope has been good. A few relatively minor electronic bugs have made their presence known but none have caused the instrument to go off the air. Still, with some hundreds of JSM-35's having come off the production line, all design defects should have been eliminated long ago. Small mechanical and vacuum problems have also turned up from time to time. Their solution would have been made vastly easier if a set of systems drawings and servicing instructions were available but JEOL's legendary reluctance to provide service documentation continues to prevail.

In spite of those problems it is clear that the JSM-35c is a refined laboratory tool. The DSE SEM looks like having a busy and productive life ahead of it.

P.C. Conor,
Defence Scientific Establishment,
Auckland.

TEM Maintenance

We would like to draw your attention to a recent article in the January 1979 issue of the Proceedings of Royal Microscopical Society V 14/1 p 40-46 on Monitoring and Maintaining TEM performance. This excellent article, written by S.K. Chapman of ISI Inc. Newmarket, England gives a series of 15 checks ranging from high voltage stability to image diagnosis.

For those of you alive in 1979 here's another reminder of how long you've hung on for. For those of you who weren't yet born, read how much excitement an LED evoked.

Office Holders

President
Lloyd Donaldson
lloyd.donaldson@scionresearch.com

Vice President
Ms Helen Turner
School of Science and Engineering, Waikato University
h.turner@waikato.ac.nz

Secretary
Hilary Holloway, Biomedical Imaging Research Unit, University of Auckland
h.holloway@auckland.ac.nz

Treasurer
Jacqui Ross, Biomedical Imaging Research Unit, University of Auckland
jacqui.ross@auckland.ac.nz

Editorial Content

Editor
Andrew McNaughton
Otago Centre for Confocal Microscopy
andrew.mcnaughton@stonebow.otago.ac.nz

Please send all submissions for possible inclusion in Microscopy in Focus to the Editor.

Advertising material should be clearly described as such and all graphics in their final form. Sizing of images will be done to fit page layouts, but no editing of style or content will be done. Please include the size of the advertisement required, A full A4 page is $150, half A4 page $75. Quarter page and below charged at $40

Material for inclusion on the Microscopy New Zealand website should also be sent to the Editor.

Membership

Becoming a member of Microscopy New Zealand brings the benefits of being in contact with the wider microscopy community.

Membership Costs

Annual subscription fees are:

$20 for standard membership
$10 for student membership
$40 for corporate subscription to the newsletter.

To become a member, contact the Society's secretary or down load a membership form from the Society's website at: http://microscopynz.otago.ac.nz/

List of Contributors

Lloyd Donaldson

Richard Easingwood

Andrew McNaughton

Allan Mitchell

Jacqui Ross