

CURRICULUM VITAE

PERSONAL STATEMENT

I am an experienced senior research scientist in colloid science, physics and mathematical modelling.

I am a very hard working, motivated, persistent, polite, and honest person with high initiative. I have the ability to accomplish short and long term planning efficiently. My time management skills are exceptional. I am an achiever who sets a high standard and follows each task from its inception through to ultimate completion with enthusiasm, discipline and flexibility expected of a professional. I have mastered sophisticated analytical and research skills both theoretically and experimentally.

PERSONAL ATTRIBUTES

- Effective communication skills, with proven ability communicating with international/inter-state clients, service providers, management and team members, both verbally and in writing.
- Excellent project management, leadership and mentoring skills. Proven ability to work effectively as a leader or member of project teams encompassing multiple functional disciplines in many client and internal research and development (IR&D) projects.
- Exceptional short and long term project planning skills.
- Excellent lateral thinking, analytical and problem solving skills with very strong mathematical modelling, observation and hands-on skills.
- Quicker thinker with the ability to adapt and change to a different direction.
- Highly innovative, energetic and proactive motivated by challenges and work satisfaction.
- Positive in attitude and ability.
- Cope extremely well under pressure to meet very tight timelines and project targets.
- Practical, reliable and dedicated to personal and professional growth.
- Pursue career satisfaction with 100% effort.
- Exemplary work ethic and maintenance of safe working environment.

CAREER SUMMARY

Period	Job Title	Where
Aug. 2009 - Present	Senior Research Fellow	School of Mathematics and Statistics, University of South Australia
Oct. 2006 - Jun. 2009	Principal Scientist/Project Manager	Research Laboratories of Australia Pty Ltd (RLA)
Nov. 2004 - Oct. 2006	Senior Research Physicist	
Jun. 1996 - Nov. 2004	Research Physicist	
Dec. 1994 - May 1996	Research Officer	The Department of Soil Science, The University of Adelaide
Jan. 1986 - Sept. 1990	Lecturer	Department of Minerals Engineering, Wuhan University of Technology
Dec. 1984 - Dec. 1985	Associate Lecturer	

PROFESSIONAL PROFILE

School of Mathematics and Statistics, University of South Australia

Aug. 2009 - Present Senior Research Fellow

Key responsibility is:

- Develop theoretical models that relate measured data to salient properties of samples such as the electric charge of toner particles.

Research Laboratories of Australia Pty Ltd (RLA)

Oct. 2006 – Jun. 2009 Principal Scientist/Project Manager

Nov. 2004 - Oct. 2006 Senior Research Physicist

Jun. 1996 - Nov. 2004 Research Physicist

Key Responsibilities:

- Participate and manage Japanese client funded high viscosity toner (HVT) project EE21, and RLA key IR&D 34 (Part II), 32, 30, 27, 25, 21, 16 and 7.
- Participate in a) HVT projects Neon (Japanese client) and RLA IR&D 14 and 6, b) Tonejet project Roadrunner (US client) and UniSA project, and c) Watermark project.
- Provide technical support to HVT client funded projects Kenruko and Skipper.
- Participate or chair the client project meeting or and teleconferences.
- Communicate with client, management and team members.
- Organise and perform toner evaluation, and analyse, compile and report results.
- Source service and goods providers both national and internationally for managed projects.
- Write project milestone and final reports, prepare client funded and RLA IR&D project proposals.
- Chair HVT process and engineering meeting.

Achievements:

On projects:

- Successfully completed several phases of the project EE21.
- Scientifically selected heating source for image fixing in HVT printer, especially digital press, to improve energy efficiency. The selected heating source was determined to be the most significant factor in achieving fusing quality target and improved image quality such as optical density, gloss level and colour reproduction.
- Vigorously pursued to analyse HVT Total Volatile Organic Compound (TVOC) by German Company LGA and helped to formulate toner to meet Blue Angel TVOC criteria, which was one of the key targets set by the client.
- Developed and standardised HVT evaluation process in RLA as main contributor.
- Successfully measured following properties first time at RLA: a) nip pressure in rollers; b) carrier, total image layer thickness, and solid content on print; c) thermal capacity of various toner raw materials and papers; d) energy consumption and water content loss from paper during fusing process.
- Presented three papers at International Imaging Science and Technology (IS&T) conference, issued over 110 technical reports, and delivered six presentations at RLA seminar or HVT process and engineering meeting.
- Developed a device to measure ink droplets charge.
- Developed mathematical model to simulate particle/droplet trajectory and image development under electric field in the image development region in the printer for Watermark project.
- Developed experimental design and result analysis package based on Taguchi Methods.
- Trained 4 graduate physicists and 2 new senior physicists. One of them is now a senior manager.

In advancing HVT technology:

- **Image Development:** a) improved understanding of physics in HVT image development, especially the role of corona and its advantage over scorotron, the importance of toner smoothness on the development roller, and fluid dynamic condition during development; b) initiated and supervised to construct the first bench top HVT development unit to demonstrate the HVT principles to RLA's current and future clients. Two client funded projects built their rigs based on this design.
- **Toner Recycling and Management:** a) developed the mathematical model for toner recycling and management in the HVT printer; b) designed and constructed first torque based toner solid content measurement device at RLA.
- **Fusing Process:** a) supervised to design and construct generic hot roller fuser; b) investigated the importance of paper and hot roller properties in achieving fusing target (over 700 patents on fuser were reviewed); c) investigated the role of the carrier and pressure in improving fixing quality experimentally, penetration of melt toner into substrate theoretically; d) recommissioned hot roll draw down device and toner hot plate analysis techniques at RLA; e) developed the mathematical model to simulate fusing energy consumption and thermal distribution in hot roll fusing system. Confirmed the model with experimental result.
- **Fixing Quality Analysis:** a) designed and commissioned pen offset test, static and dynamic crease test, and rolling test apparatus; b) developed/improved techniques for image fixing quality assessment by developing an application using image processing technology.
- **Image Quality Analysis:** Developed an application to analyse image quality in batch. The application has improved efficiency in image quality analysis and reliability with minimum intervention from assessor, and reduced the discrepancy between computed results and those from visual inspection by experienced assessor.

On discovery:

- Discovered a different means to charge toner during development. A patent was filed.
- Discovered the relationship between average toner particle size (of equivalent surface area) and image uniformity.

Jan. 2000 – Jun. 2002 IT System Administrator

Key responsibilities were:

- Administrate Linux and Window NT servers and to provide Desktop applications support.
- Keep company network running smoothly and up to date.
- Maintain file, Apache web, Qmail, MySQL and domain servers.

Achievements were:

- Implemented RLA intranet that provided four MySQL database. Timesheet management system was used until 2007. The ordering system is still being used.
- Solely designed relational MySQL database and wrote more than 55K lines of codes to implement RLA intranet.
- Developed patent acquisition system. Patents (in HTML format) were downloaded and extracted into MySQL database automatically.

Department of Soil Science, The University of Adelaide

Dec. 1994 - May 1996 Research Officer

Accomplishments/Responsibilities:

- Conducted research to study soil domain structure.
- Developed a very basic soil domain model.
- Operated porosity measurement instrument.

Department of Minerals Engineering, Wuhan University of Technology

Jan. 1986 - Sept. 1990 Lecturer

Accomplishments/Responsibilities:

- Delivered lecture to 4th year students on modern mineral processing technology.
- Set tutorials, tests and examinations.
- Supervised student field trips.
- Participated in client funded research on improvement of graphite flotation technology.

Dec. 1984 - Dec. 1985 Associate Lecturer

Accomplishments / Responsibilities:

- Delivered lecture to 3rd year students on special mineral separation.
- Set tutorials, tests and examinations.
- Supervised student field trips.

EDUCATION/QUALIFICATION

TERTIARY EDUCATION

- 1994 IWRI, University of South Australia, Mawson Lakes, Australia.
Ph.D. in Applied Science.
Thesis: Surface and Interfacial Processes in the Selective Flotation of Zircon.
- 1984 Wuhan University of Technology (China).
Masters Degree in Mining Engineering.
Thesis: Study on Asbestos Fibre Movement in Hydrocyclone.
- 1982 Wuhan University of Technology (China).
Bachelor Degree in Mining Engineering.

PROJECT MANAGEMENT SHORT COURSE

- 2006 Advanced Project Management, AIMS.
- 2005 Leadership and Team Management, Chifley Business School.
- 2005 Workplace Leadership, AIMS.

COMPUTER And PROGRAM SKILLS

System Administration

Operating Systems (OS): Linux and Windows.

Desktop support: a) Extensive knowledge in Microsoft Office Professional Suite (from Office 97 to Office 2007) and many other desktop applications. b) Computer hardware selection, installation and set up.

Application Development Skills

Development platform: Microsoft Visual Studio, NetBeans IDE, and MATLAB.

Web development: Intranet and database design, and coding and implementation.

Mathematical modelling: Algorithm development and implementation to solve complex problems, such as numeric solution of partial differential equation, statistics analysis, colour space conversion and mathematical graphic manipulation technical, and scientific experimental design and data analysis.

Software development: Develop software with friendly graphic user interface, helpful documentation and user manual.

Program Languages

Microsoft packages: Visual Basic and C#. High level.

Languages: MATLAB, Java, Perl, MS Office Visual Basic Application (VBA) and Fortran. Medium to high level.

Web development languages: Java and VB script, PHP and SQL. Medium level.

LANGUAGE

English Good oral fluency and very high standard report writing.

Chinese Exceptional written and oral fluency.

RESEARCH PAPERS AT CONFERENCES

1. Charlie M. Mao and Alvin Chowles, Image Fixing Quality Assessment: A Crease Test Apparatus, 23rd International Conference on Digital Printing Technologies and Digital Fabrication 2007, Anchorage, Alaska; Sept 2007; p. 395-399. [Web Link](#).
2. Charlie M. Mao and Alex Ozerov, A New Approach to Image Fixing Quality Assessment - A Pen Offset Apparatus and Image Processing Analyzer, IS&T's NIP22: International Conference on Digital Printing Technologies, Denver, Colorado; Sept 17, 2006; p. 458-462. [Web Link](#).
3. Alexander B. Ozerov and Charlie M. Mao, A Novel High Field Electrophoretic Cell for Characterisation of Concentrated Liquid Toners, IS&T's NIP19: International Conference on Digital Printing Technologies, New Orleans, LA; Sept. 28, 2003; p. 590-594. [Web Link](#).
4. Mao, Minghua; Fornasiero, Daniel; Ralston, John; Sobieraj, Slawek. Use of depressants in the separation of zircon from rutile and ilmenite (1999).
5. Mao, M.; Fornasiero, D.; Ralston, J.; Smart, R.St.C. and Sobieraj, S. "The Surface Chemistry of Zircon Flotation with Potassium Alkylamine Bis-Methylenephosphonate". 8th International Conference on Surface and Colloid Science, Adelaide, 1994.
6. Mao, M.; Fornasiero, D.; Ralston, J.; Smart, R.St.C. and Sobieraj, S. "Flotation of Zircon and Adsorption Studies in the Presence of Sodium Alkylamine Bis-Methylenephosphonate (Briquest)". The Seventeenth Australian Colloid and Surface Chemistry Student Conference, Geelong, VIC, 1993.

REFEREED PUBLICATIONS

1. Mao, M.; Fornasiero, D.; Ralston, J.; Smart, R.St.C. and Sobieraj, S. "Electrochemistry of the Zircon-Water Interface". Colloids and Surfaces, 85 (1994) 37.
2. Mao, M. "Study on Asbestos Fibre Movement in Hydrocyclone". Nonferrous Metal (Overseas Edition), 38(4) 36, (1986).
3. Mao, M. "The Development of Hydrocyclone Techniques". Nonferrous Metal, 38(3) 58, (1986).

PATENT

1. Mao, Minghua (Charlie), 2008, ELECTROSTATOGRAPHIC PRINTING MACHINE, RESEARCH LABORATORIES OF AUSTRALIA PTY LTD, WO/2008/098285, <http://www.freepatentsonline.com/WO2008098285.html>.

SELECTED LIST OF DEVELOPED IN-HOUSE SOFTWARE

1. Ink droplet trajectory and image development under dynamic electric field in development region (VB).
2. Simulation of thermal distribution and energy consumption in hot roll fusing system (VB).
3. Real-time data acquisition and analysis (VB).
4. Experimental design and result analysis based on Taguchi Methods (VBA).
5. Application for fixing quality and dot quality assessment (Java).
6. Colour space conversion and graphics manipulation package, and simplex curve fitting (C#).
7. Toner management and recycling (VBA).
8. Database management, server end web page and report generation package (PHP, SQL, HTML and Java Script).
9. Patent auto-downloading and processing (Perl).

VOLUNTEER INTERNATIONAL COMMUNITY SERVICE

Membership: [TWiki Community Group](#).

Contributions: a) [Perl script](#) to convert both Microsoft word and OpenOffice writer documents to TWiki Markup format. Algorithm to convert table with rowspan and colspan is unique. The script reduces conversion time from several hours (manually) to less than a minute. b) Maintainer of MS Word to TWiki Markup Language Add-On (in VBA) since [Ver. 1.486](#).

INTERESTS

Reading, watching movies, developing software and travelling.