

05/07



637 Valley Avenue  
Solana Beach, CA 92075.2428  
Fax: 858.481.0980  
Phone: 858.481.1990

**Lori L. Wickham, Ph.D.**

**EXPERTISE: Biomedical Research, Physiology, Vascular Biology, Blood, Rheology**

**FORENSIC CONSULTING EXPERIENCE:**

Asphyxia Suffocation Drowning Heart Attack (MI) Bleeding Disorders Heat Shock  
Trauma Hemothorax Hemorrhagic Shock Anti-Coagulation Therapy COPD  
Abnormal Uterine Bleeding Amenorrhea Dysmenorrhea Menorrhagia Hormone Imbalance  
Thrombocytopenia Blood Processing (Transfusion Plasmapheresis Hemodilution/concentration)  
Implant Design Patent Infringement **Medical Records Review** Histology Dog Bites  
Organic Chemistry-Polar and Non-polar Solvents&Solute Chemical Sensitivity (Hair/Skin)  
Charcot-Marie-Tooth Disease Peroneal Nerve Dysfunction Neuropathy Taser Death/Meth  
Syncope Iatrochemistry(Side Effects) Subdural Hematoma Necrotising Fasciitis StrepA

**RESEARCH AND ACADEMIC EXPERIENCE:**

***Biology:*** Molecular Cellular Tissue Organ Organismal

***Physiology:*** Cardiovascular Hematological Animal Veterinary Comparative  
Thermal Energetics Diving High Altitude Hypoxia Histology  
Biochemistry

***Engineering/  
Rheology:*** Cell Mechanics Soft / Hard Tissue Mechanics Blood Flow  
Biomaterials Implants Medical Devices Microcirculation  
Plasma-skimming

***Additional  
Coursework  
and Training:*** WAMI Medical Program Histology Biochemistry Veterinary Medicine  
Boat Handling Sailing Marine Sciences SCUBA/ PADI cert.1981  
Seamanship/Shipboard Techniques Oceanography Aquatic Chemistry  
Instructor, Docent Training Program – San Diego Natural History Museum  
Volunteer Instruction and Guest Lectures K-12 & Community Forums  
University Tutorials/Teaching in Calculus, Chemistry, Zoology, Physics,  
Statistics, Physiology, Botany, Marine Biology and Oceanography  
Expert Depositions: *The Law, Urban Myths, Reality* - FCA Symposium

***Instrumentation and Laboratory Skills List, Page 10.***

## **PROFESSIONAL EXPERIENCE:**

**Forensic Scientist, John Fiske Brown Associates, Inc. 10/03-present.**

**Scientific Consultant, Biomedical Sciences and Engineering, Free-lance, San Diego, CA. 5/94-present.**

**Visiting Postdoctoral Scholar, Supervisor, Vertebrate Physiology Laboratory, Department of Biology, University of California, Santa Cruz; Joseph M. Long Marine Laboratory, 100 Shaffer Road, Santa Cruz, CA 95060. 11/92-5/94.**

### **Duties:**

Undergraduate and graduate student supervision in laboratory and field studies of comparative physiology and physiological ecology of marine mammals, birds and other vertebrates

Management of in-house research and staff including laboratory instrumentation and supplies, captive animal husbandry and facilities maintenance (e.g. lab vehicles, boats, dolphinarium, pools and animal quarters), and veterinary services for the multi-user facility.

Administration and Regulatory Affairs - management of grants and budgets (purchases and acquisitions, stipends), NMFS, USDA, EH&S code requirements.

Management of collaborative research with visiting scientists

Undergraduate Independent Study advisor

Necropsy of beach stranded animals and collection of tissue samples

Preliminary studies of vascular mechanics in pinnipeds

**Research Fellow – National Research Service Award [N.R.S.A.], Department of Applied Mechanical and Engineering Sciences (AMES) - Bioengineering, 0412, University of California, San Diego, La Jolla, CA 92090-0142. 8/91- 8/92.**

### **Duties:**

Formulation and execution of original research on leukocyte-endothelial cell interactions (LEA) and mechanical assessment using various methods.

Collaborative research on cell mechanics and adhesion in the Cell Biophysics Laboratory using a variety of connective tissues and substrates.

Supervision and advisement for undergraduate and graduate research.

Collaboration involving a new tapered flow-chamber for cell adhesion studies.

Laboratory responsibilities for cell culture, mAb modifications, micropipette fabrication and aspiration experiments, light microscopy, video fluorescence microscopy, data analysis and software applications (statistics, word processing, graphics), manuscript preparation and editing, publication, and presentation of results at scientific meetings.

Studies using monocyte-macrophages (THP-1), endothelium (HUVEC, BOAEC), fibroblasts, red cells, neutrophils, collagen, fibronectin, laminin, FMLP, IL-1, TNF- $\alpha$ , anti-ELAM-1, MCSF, MCP-1.

**Research Scientist II - Suspension Rheologist.** Department of Chemical Engineering, University of New Hampshire, Kingsbury Hall, Durham, NH 03824-35-91. **4/88-4/91.**

**Duties:**

Design and development of experimental methods for *in vitro* video fluorescence microscopy of red cells in capillaries.

Fabrication of microvascular replicas using polymers.

Sample acquisitions and phlebotomies.

RBC labeling with FITC-Dextran.

Data interpretation and analysis from videomicroscopy and effluent collection, applications of software. for statistical evaluation, graphics and wordprocessing.

Preparation of manuscripts, publications of results, presentations at meetings.

Management of the Hemorheology Laboratory facilities and supplies.

Undergraduate and graduate student advisement on independent research projects.

**Research Assistant,** Water Research Center, Institute of Northern Engineering, University of Alaska-Fairbanks, Fairbanks, AK 99775. **Spring Semester, 1988.**

**Duties:**

Research on trophic dynamics in Arctic marine and terrestrial systems using radioisotope analysis of nitrogen and carbon ( $\delta N^{15}$  C<sup>13</sup>).

Sample preparation for isotopic analysis including tissue dissection, dialysis, desiccation, lyophilization, and cuprox mixtures.

Marine and terrestrial primary producers such as plankton, marine algae, grasses and terrestrial herbaceous species.

Marine and terrestrial consumers including plankton, jellyfish, shellfish and fin-fish, euphausiids (Krill), marine mammals (pinnipeds, cetaceans), moose, caribou, polar bear and other terrestrial species.

**Teaching Assistant,** Institute of Marine Science, 137 IRVII, University of Alaska, Fairbanks, AK 99775-1080. **1/87-6/87.**

**Duties:**

Lecture in Introductory Oceanography for undergraduates.

Assist professor in daily class preparation and assignments.

Grading of all homework and examinations.

Acquisition and scheduling of guest speakers.

Office hours for student advisement.

Full responsibility for final month of class and grade allocation at semester end [professor was at sea on oceanographic cruise].

**Research Assistant,** Water Research Center, Institute of Northern Engineering, University of Alaska, Fairbanks, AK 99775. **8/86-1/87.**

Radioisotope studies/Trophic Dynamics in Arctic Food Webs (contacts and duties listed above for spring semester 1988).

**Collaborative Researcher**, Department of Physiology and Biophysics, University of Southern California, 1333 San Pablo Street, Los Angeles, CA 90033. **6/86-6/87**.

**Duties:**

Original research on red cell aggregation and viscoelasticity of mammalian blood.

Acquisition of blood samples from ringed seals, harbor seals, elephant seals, humans and domestic pigs from academic (UCSD- Pathology) and private research organizations (Sea World - HSWRI).

Blood separation and reconstitution for rheological assessment.

Myrenne aggregometry, OCR-D viscoelasticity, Contraves viscometry, Haake plasma viscosity measurements, plasma protein determinations sedimentation rates (ZSR and ESR), electrophoretic mobility, micropipette aspiration of white cells (PMN) and measurements of membrane viscosity and elasticity.

Data analysis, statistical evaluation, graphics and wordprocessing using various computer software and hardware.

Writing and publication of manuscripts and presentation of results at scientific meetings.

**Collaborative Researcher**, Long Marine Laboratory, University of California, 100 Shaffer Road, Santa Cruz, CA 95060. **Spring 1985**.

**Duties:**

Original research on comparative hemorheology of Northern elephant seals.

Phlebotomies of wild and captive elephant seals.

Rheological analyses of blood including cone-plate viscometry, capillary viscometry, hematology, colloid oncotic pressure, red cell morphology and plasma protein determinations.

Data analysis, manuscript preparation, and publication of results.

**Collaborative Researcher**, Department of Pathology, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093. **1985-87**.

**Duties:**

Collaborative and independent research on cardiovascular adaptations to hypoxia in harbor seals and swine.

Whole body and myocardial optimal hematocrit determinations using Haemonetics Blood Processor.

Surgical assistance in open-chest experiments monitoring cardiac performance during acute hypoxia as well as sequential hemodilution and hemoconcentration.

Hematology and hemorheology measurements during experiments including capillary and cone-plate viscometry, CBCs and morphological analysis.

Blood storage and reconstitution for hemoconcentration studies.

Necropsy and tissue collections for histological and radioisotope analysis (blood flow determination).

Data analysis, statistical evaluations, graphics and manuscript writing using various software and hardware.

Publication of results and presentation at scientific meetings.

**Collaborative Researcher**, Hubbs Sea World Research Institute - **Summer 1985-87**.

**Duties:**

Comparative hematology and hemorheology of captive and newly-captured marine mammals.

CBCs, plasma proteins, red cell morphology, cone-plate and capillary viscometry.

Data analyses, publication of results, presentations at scientific meetings.

**Research Assistant**, Institute of Marine Science, 221 O'Neill Building, University of Alaska, Fairbanks, AK 99775-1080. **1984-85**. Supervisor: R. Elsner, Ph.D.

**Duties:**

Comparative Hemorheology/Doctoral Research.

Proposal preparation and submission for funding.

Grant budgeting and administration for research.

Facilities maintenance and husbandry for captive seals, coliform, pH, and water quality testing of animal pools and decks.

Management of laboratory supplies and facilities.

Design and development of a capillary viscometer using the machine shop and collaboration with the university glassblower.

Comparative hematology of captive and wild mammals including those from local farms, Sea World of San Diego, and the University of Alaska.

Data analysis, statistics, graphics, and word processing using various software and hardware.

Preparation of publications and presentations for scientific meetings.

Public relations interviews

**Research Assistant**, Institute for Marine Biomedical Research (presently the Center for Marine-Related Research), UNC-Wilmington, 7205 Wrightsville Avenue, Wilmington, North Carolina, 28403. **1982-84**.

**Duties:**

Research on genetic preadaptation to high altitude hypoxia and hypobarica using inbred murine models.

Analysis of hematopoietic Responses such as hematocrit and plasma volume.

Biochemistry analyses of superoxide dismutase (SOD) in liver, heart, muscle, and brain using radioimmunoassay (RIA), spectrophotometric, calorimetric techniques.

Volunteer for behavioral and physiological research on high pressure neurological syndrome (HPNS) in mammals (mice, monkeys) during hyperbaria.

Gas mixtures for hyperbaric and hypobaric studies.

Use and maintenance of the hyperbaric and hypobaric chambers.

Design and manufacture of a novel murine treadmill for hypobaric exercise and performance experimentation.

Participation in data analyses, publications, and scientific meetings on site.

**College Work Study Laboratory Assistant**, Department of Biological Sciences, University of North Carolina, Wilmington, NC 28403. **1981-84.**

**Duties:**

Zoology - responsible for laboratory specimens, archives, setup and breakdown, as well student instruction in dissections (e.g. clams, earthworm, frog, turtle heart, fetal pigs)

Microbiology - laboratory setup, breakdown, specimen collections,

Botany - laboratory setup, breakdown, student instruction,

Herbarium - specimen collection and maintenance, annual plant sales,

Invertebrate Zoology - specimen collection, laboratory setup, student instruction, fieldwork,

Planktonology - laboratory setup and instruction, specimen collection,

Ichthyology - Volunteer research assistant in studies of fish aggregating devices (FADS) deployed off Wrightsville Beach, NC; daily SCUBA inspection and use assessment (encrusting organisms and pelagic fishes) as well as daily catch interviews with sportsfishermen.

**MEMBER:**

Forensic Consultants Association of San Diego

American Association for the Advancement of Science

Sigma Xi Scientific Research Society

North American Society of Biorheology

The American Physiological Society

The Biomedical Engineering Society

The Microcirculatory Society

The Society for Marine Mammalogy

**PROPOSALS FUNDED:**

Physiological and Ecological Implications of Blood Viscosity Variations in Marine Mammals. Sea World, Inc. of San Diego and Hubbs Marine Research Institute, San Diego, 1985.

Coronary Flow and Resistance to Hypoxia in seals. Alaska Affiliate of the American Heart Association, AHA-87-002-1. R. Elsner, P.I, 1987.

**EDUCATION:**

**Ph.D.** University of Alaska, Marine Science, 1988

**B.S.** University of North Carolina, Marine Biology,

**Magna Cum Laude with Honors in Biology**, 1984

**HONORS AND AWARDS:**

National Institute of Health Fellowship - 1991-1992

Sea World Stipend - Research Assistantship,

University of Alaska, Fairbanks - 1987

Grand Prize Student Award, 1985 Arctic Science Conference

I. Larus AAAS Travel Award -National AAAS meeting, 1986

Frank H. Allen Scholarship -1983-84

Lee Murchison Marvin Scholarship - 1983-84

The Honor Society of Phi Kappa Phi (Induction) - 1983

Academic Scholarship - 1982-83

## **PUBLICATIONS:**

### **DISSERTATION & THESIS:**

Wickham, L. L. 1988. Physiological and ecological implications of hemorheological variations in marine and terrestrial mammals. Ph.D. Dissertation, University of Alaska, 170 pp. (Available through library request)

Wickham, L. L. 1984. Iontophoretic backfilling of sensory and motor neurons in the brain of the blue crab, *Callinectes sapidus*. Honors Thesis, University of North Carolina, 30 pp. (Available through library request).

### **JOURNAL ARTICLES:**

Wickham, L.L. 2007. Drowning, homicide and misadventure: water-related accidents and cause of death. *The Daily Transcript (SDDT.com)*, 122(88): 5A.

Wickham, L.L. 2007. Forensic analysis of injury and death by asphyxia. ([www.tasanet.com](http://www.tasanet.com)). *Technical Advisory Service for Attorneys*

Wickham, L.L. 2006. Blood, traffic and rheology: Go with the flow. *The Daily Transcript (SDDT.com)*, 121(208): 6A.

Wickham, L.L. 2006. Forensic implications of asphyxia. John Fiske Brown Associates, Inc. Staff Member Articles ([www.FiskeBrown.com](http://www.FiskeBrown.com)).

Wickham, L.L. 2006. Waiting to exhale: Asphyxia and death. *The Daily Transcript (SDDT.com)*, 121(144): 5A.

Debes, J.C. and L.L. Wickham. 2006. "Stress" applied to both mechanical, physiological concepts. *The Daily Transcript (SDDT.com)*, 121(87): 6A.

Debes, J. C. and L. L. Wickham. 2006. Stress. Chapter XXX. *In The Encyclopedia of Biomedical Engineering*, Wiley and Sons pp.xxx. [In Press].

Debes, J. C. and L. L. Wickham. 2004. Watch your engines, *Letters to the Editor: Mechanical Engineering*, 126(6): 8.

Shyy, Y.-L., L. L. Wickham, Y.-L. Hu, E. Saldivar, S. H, Telian, A.J. Valente, K.-L. P. Sung and S. Chien 1993. Human monocyte colony stimulating factor increases the adhesion of monocytes to endothelial monolayers: Possible mediation through monocyte chemotactic protein (MCP-1). *J. Clin. Invest.*, 92:1745-1751.

Carr, R. T. and L. L. Wickham. 1991. Influence of vessel diameter on red cell distribution at microvascular bifurcations. *Microvascular Research*, 41: 184-196.

- Carr, R. T. and L. L. Wickham. 1990. Plasma skimming at serial microvascular bifurcations. *Microvascular Research*, 40: 179-190.
- Wickham, L. L., R. M. Bauersachs, R. B. Wenby, S. Sowemimo-Coker, H. J. Meiselman, and R. Elsner. 1990. Red cell aggregation and viscoelasticity of blood from seals, swine, and man. *Biorheology*, 27: 191-204.
- Wickham, L.L., R. Elsner, F.C. White, E. Hill, D. Wilford and E. Meyerhoff. *In vivo* Optimal Hematocrit of Seals and Swine: A viscometric approach. *Unpublished Manuscript*
- Wickham, L. L., D. P. Costa, and R. Elsner. 1990. Blood rheology of captive and free-ranging northern elephant seals and sea otters. *Canadian Journal of Zoology*, 68: 375-380.
- Wickham, L. L., R. Elsner, F. C. White, and L. H. Cornell. 1989. Blood viscosity in phocid seals: possible adaptations to diving. *Journal of Comparative Physiology B: (Biochem. System. Integrat. Physiol.)* 159(2): 153-158.
- Elsner, R. and L. L. Wickham 1988. Implications of physiological studies of seals. *Marine Mammal Science*, 4(1): 34-43

### **ABSTRACTS:**

- Shyy, J.Y. , L. Wickham, Y-L. Hu, K-L. P. Sung, and S. Chien. 1992. MCSF increases the adhesion of monocytes to endothelial cell monolayers: Possible pathway through MCP-1. *FASEB J.* (April 1992).
- Meiselman, H. J., M. A. Castellini, R. Elsner, R. B. Wenby, and L. L. Wickham. 1991. Hemorheological behavior of seal blood. Seventh Euro. Conf. on Clinical Hemorheology. (July 1991), U. K. *Int. J. Microcirc.* 11(6): 708.
- Wickham, L. L. and R. T. Carr. 1990. Influence of vessel diameter on red cell distribution at microvascular bifurcations. 37th Ann. Conf. Microcirc. Soc.: (*FASEB J.*), (April 1990).
- Carr, R. T., L. L. Wickham, and F. W. Rong. Red cell distribution in microvascular networks. Microvascular Networks Sat. Symp. XXXI. I.U.P.S. Congress, *Int. J. Microcirc. Clin. Exp.* 8 (Suppl. 1): S26 (May 1989).
- Carr, R. T. and L. L. Wickham. 1989. Plasma skimming at downstream bifurcations. Proc. 36th Ann. Conf. Microcirc. Soc.: 50 (*FASEB J.*)
- Hill, E. P., D. C. Willford, R. Elsner, F. C. White, E. Merhoff, and L. L. Wickham. 1987. Critical total oxygen transport (TOT) and critical PVO<sub>2</sub> during hypoxia and anemia in pigs and seals. *The Physiologist*, 30(4): 189.
- Wickham, L. L., R. M. Bauersachs, H. J. Meiselman, and R. Elsner. 1987. Unusual hemorheological properties of seal blood: viscosity, sedimentation rate, and RBC aggregation. *The Physiologist*, 30(4): 189.

Wickham, L. L., R. Elsner, and L. H. Cornell. 1986. Comparisons of erythrocytes and blood viscosity in seals and pigs. *Proc. I.U.P.S. XXX Congress*, 16: 86.

Wickham, L. L., R. Elsner, L. H. Cornell, and F. C. White. 1986. Comparative hemorheology in terrestrial and marine mammals. *Proc. National Meeting AAAS*, 152: 151.

Wickham, L. L., L. H. Cornell, and R. Elsner. 1985 Red cell morphology and blood viscosity variations in marine mammals: Possible adaptations of phocid seals. *Proc. Sixth Biennial Conference on the Biology of Marine Mammals*, 6: 86.

Wickham, L. L., L. H. Cornell, and R. Elsner. 1985 Red cell morphology and blood viscosity implications in terrestrial and marine mammals: Possible adaptations of phocid seals. *Proc. Arctic Science Conference, 36th Ann. Alaska Science Conference*, 36: 121.

**REFERENCES:**

To be furnished upon request

## Techniques and Skills:

Biology/ Chemistry:	Cell Culture/Sterile Technique THP-1, HUVEC, BOAEC, RBC, PMN, lymphocytes, fibroblasts Cell Adhesion Assays: Cytokine, mAB modifications, FMLP, IL-1, TNF, anti-ELAM-1, MCSF, MCP-1, Histology (WAMI, soft and hard tissue) Light and Electron Microscopy: Autoclave, lyophilization Hematology (CBCs, plasma proteins, clotting analyses, clinical chemistries, sedimentation rates, diagnostics) Organic and Inorganic Chemistry	Protein/Enzyme Assays: RIAs, SOD, LDH Fibronectin, Laminin, Collagen Integrins: Selectins ELAM-1, ICAM-1,2, VCAM-1, LFA-1, Mac-1 Spectrophotometry Iontophoresis Dialysis Coulter Counter Hemoglobinometer Physical Chemistry Medical Biochemistry (WAMI)
Computer:	UNIX, VAX/VMS, PC, MAC Various Mac/PC Software: Word Wordperfect, Excel, Graphics and Statistics packages	FORTRAN, COBOL SAS, SASGRAPH, MINITAB Windows, Internet Software Data Loggers, GIS systems
Physiology:	Animal Care/Maintenance Anesthesia, sedation Phlebotomy, catheterization Blood Processor (Haemonetics) Experimental Hemodilution Experimental Hemoconcentration Blood Chemistry: e.g. lactate, glucose Radioisotopes (blood flow, energetics) Captive Animal Studies, Field Studies	Surgical Technique, Necropsy Laboratory Instrumentation: Physiograph, EKG, EEG Blood Gas Analysis Oxygen Consumption (var.) Calorimetry (Direct/Indirect) Thermocouples/Minimitter Hypobaric Chamber Studies Hyperbaric Chamber Studies
Marine Science:	SCUBA (cert. 1983) Oceanographic Cruises R/V Alpha Helix Shipboard Laboratory Techniques NMFS-NOAA Permits (Marine Mammals) APHIS Regulations (captive animals) Public Instruction, Outreach San Diego Natural History Museum	Small Boat Handling (cert. UNCW -1983) Water quality testing - pH, coliform, turbidity, DOS Biology Field Methods Boat, Facilities Maintenance Volunteer Instruction K-12
Engineering/ Rheology:	Viscometry: capillary, cone-plate couette (Brookfield, Contraves, Haake, OCR-D) Cell Mechanics: Micropipette aspiration, modeling Microvascular techniques: Replicas, Network Analysis, <i>In Vivo</i> , <i>In Vitro</i> , Video fluorescence microscopy Tissue Mechanics Bone, Ligament, Cartilage	Cell Aggregation Indices: Myrenne Aggregometer Electrophoretic mobility ESR, ZSR Cell Adhesion Analyses Tapered Flow Chamber Studies Colloid Oncotic Pressure Histomorphometry Biomaterials, Implants