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Biotechnology Science and Engineering Program Coordinator
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Appointments

2004-present Associate Professor, University of Alabama in Huntsville
Biotechnology Program Coordinator
2005-present Chief Science Officer of ExtremoZyme Inc.
1998-present Adjunct Professor, Material Science, University of Alabama in Huntsville
1998-2004 Assistant Professor, University of Alabama in Huntsville

Professional Preparation

Sabbatical Leave (2006)

The Scripps Research Institute

Area of Research: Macromolecular crystallization and technology development in X-ray crystallography

Host: Ray Stevens, Ph.D. , Peter Kuhn Ph.D.

Postdoctoral Fellow (1993-1998)

Institut de Biologie Moléculaire et Cellulaire, Centre National de la Recherche Scientifique, Strasbourg, France

Area of Research: Macromolecular crystal growth

Advisor: Richard Giegé Ph.D, Director of Research of CNRS, President of the French Society of Biochemistry and Molecular Biology.

Ph.D. Biochemistry (1992)

Department of Biochemistry, University of California, Riverside

Area of Research: Molecular biology applications toward X-ray structure investigations

Advisor: Alexander McPherson Ph.D., Professor of Biochemistry, CA, U.S.

B.S. Biochemistry (1985)

Department of Chemistry and Biochemistry, University of California, Los Angeles 1985

Professional Societies

American Crystallographic Association, American Association for the Advancement of Science, Association Française de Cristallographie, Sigma Xi Scientific Research Society, Alpha Chi Sigma Chemistry Fraternity

Honors

2007 Elected member of the *U.S. National Committee for Crystallography*

2002 Foundation Award for Research and Creative Achievement

2002 Dean's Service Award, College of Science, University of Alabama in Huntsville

2001 Sigma Xi Scientific Research Society, UAH Researcher of the Year

1998 Walton B. Sinclair Outstanding Teaching Assistant Award

Publications

- Hughes, R. and **Ng, J.D.** (2007). Can small laboratories do structural genomics. *Crystal Growth and Design* (In press).
- **Ng, J.D.**, Stevens, R.C. and Kuhn P. (2007). Protein crystallization in restricted geometry: advancing old ideas for modern times in structural proteomics. *Methods in Molecular Biology* (In press)
- Wilson, R.C., Hughes, R.C., Curto, E.V., **Ng, J.D.** and Twigg, P.D. (2007). Backbone ^1H , ^{15}N , and ^{13}C Resonance Assignments and Secondary Structure of a Novel Protein OGL-20P^T-358 from Hyperthermophile *Thermococcus thioreducens* sp. nov. *Molecules and Cells* (In press)
- Shaw, N., Tempel W, Chang, J., Yang, H., Cheng, C., **Ng, J.D.**, Rose, J., Rao, Z. Wang, B.C. Liu, Z.J, (2007). Crystal structure solution of a ParB-like nuclease at atomic resolution. *Proteins* (in press).
- Pikuta, E., Marsic, D., Itoh, T., Bej, A.K., Tang, J., Whitman, W., **Ng, J.D.**, Garriott, O.K. and Hoover, R.B. (2007). *Thermococcus thioreducens* sp. nov., a novel hyperthermophilic, obligately sulfur-reducing archaeon from a deep-sea hydrothermal vent. *J Syst Evol Microbiol.* (In press)
- Baird, J.K., Caraballo, K. and **Ng, J.D.** (2007). Kinetics of protein crystallization. Book Chapter in Focus on Crystal Growth Research (Ed: G.V. Karas) pp 173-195. (In press).
- **Ng, J.D.** and Garcia-Ruiz, J.M. (2006). Counter-diffusion capillary crystallization for structural genomics. *Trends in Drug Discovery* 3:36.
- Pradhan, D., Marsic, D., Garriott, O., Meehan, E., and **Ng, J.D.** (2006). Isolation of Novel Alkaliphilic Bacteria from Lake Makat, Tanzania and Recombinant Expression of Two New Proteases. *Proceedings of International Society of Extremophile and their Application* (ISEA, Tokyo, Japan)3:330.
- Garcia-Ruiz, J.M. and **Ng, J.D.** (2006). Counter-diffusion capillary crystallization for high throughput applications. In *Protein crystallization strategies for structural genomics* (N. E. Chayen, ed) International University Line Chapter 5.
- Caraballo, K.G., Baird, J.K. and **Ng, J.D.** (2006). Kinetics of Supersaturation Decay in the Crystallization of Canavalin. *Crystal Growth and Design.* 6:874-880.
- Garcia-Ruiz, J.M. and Ng, J.D. (2006). Counter-diffusion capillary crystallization for high throughput applications. In *Protein crystallization strategies for structural genomics* (N. E. Chayen, ed) International University Line Chapter 5.
- Wang, B. C.; Adams, M.; Dailey, H.; DeLucas, L.; Luo, M.; Rose, J.; Bunzell, R.; Dailey, T.; Habel, J.; Horanyi, P. S.; Jenney, F.; Karaveg, K.; Lee, H.-S.; Li, S.; Li, S. C.; T.; Lin, D.; Liu, Z. J.; Luan, C.-H.; Mayer, M.; Nagy, L.; Newton, M. G.; **Ng, J. D.**; Poole, F.; Shah, A. K.; Sugar, F. F.; Xu, H. (2005). Protein production and crystallization at SECSG - An overview. *Journal of Structural and Functional Genomics.* 6:233-43.
- Liu, Z. J.; Shah, A. K.; Habel, J.; **Ng, J. D.**; Kataeva, I.; Xu, H.; Horanyi, P.; Yang, H.; Chang, J.; Huang, L.; Chang, S.; Tempel, W.; Chen, L.; Zhou, W.; Lee, D.; Lin, D.; Zhang, H.; Newton, G.; Rose, J.; Wang, B.-C.(2005). Salvaging *Pyrococcus furiosus* protein targets at SECSG. *J Struct Funct Genomics* 6:121-127.
- Liu, Z. J.; Tempel, W.; **Ng, J. D.**; Lin, D.; Shah, A. K.; Chen, L.; Horanyi, P. S.; Habel, J.; Kataeva, I.; Xu, H.; Yang, H.; Chang, J. C.; Huang, L.; Chang, S.; Zhou, W.; Lee, D.; Praissman, J.; Zhang, H.; Newton, M. G.; Rose, J. P.; Richardson, J. S.; Richardson, D. C.; Wang, B.-C.(2005). The High Throughput Protein to Structure Pipeline at SECSG. *Acta Crystallogr D Biol Crystallogr* 61:679-84.
- Bernhardsdotter, E.C.M.J., **Ng, J.D.**, Garriott, O.K. and Pusey, M.L. (2005). Enzymatic properties of an alkaline chelator resistant α -amylase from an alkaliphilic *Bacillus* sp. Isolate L1711. *Process Biochemistry* 40:2401-2408.
- Pusey, M.L., Liu, Z-J, Tempel, W., Praissman, J., Lin, D., Wang, B-C., Gavira, J.A. and **Ng, J.D.** (2005). Life in the fast lane for protein crystallization and X-ray crystallography. *Progress in Biophysics and Molecular Biology* 88:359-386.
- **Ng, J.D.** (2004). DNA to protein and perspectives on protecting the fruits of structural genomic research. *Journal of International Law* 1: 40-42.

- **Ng, J.D.**, Gavira, J.A. and Garcia-Ruiz MA. (2003). Protein crystallization by capillary counter-diffusion for applied crystallographic structure determination. *Journal of Structural Biology* 142:218-231.
- Barba-de la Rosa, A. P., **Ng, J.**, Day, J. and McPherson, A. (2003) Structural characterization of satellite tobacco mosaic virus RNA. *Agrocienda* 37, 503-510.
- **Ng, J.D.** (2002). Space grown crystals are more useful for structure determination. *Annals of the New York Academy of Sciences* 974:598-609.
- Lorber, B., Theobald-Dietrich, A., Charron, C., Sauter, C. **Ng, J.D.**, Zhu, D.W. and Giege, R. (2002). From conventional crysatllization to better crystals from space: a review on pilot cryatllogenesis studies with aspartyl-tRNA synthetases. *Acta Crystallographica D58*: 1674-1680
- Gavira, J.A., Lopéz-Jaramillo, J., Toh, D., Garcia-Ruiz, J.M. and **Ng, J.D.** (2002). *Ab initio* crystallographic structure determination of insulin form protein to electron density without crystal handling. *Acta Crystallogr D58* :1085-1254
- **Ng, J.D.**, Sauter, C., Lorber, B., Kirkland, N., Arnez, J. and Giegé, R. (2002). Comparative analysis of space- and earth-grown crystals of an aminoacy-tRNA synthetase: Space-grown crystals are more useful for structural determination. *Acta Crystallographica Section D. D58*:645-652
- Hoover, R.B., Pikuta, E. V., Marsic, D. and **Ng, J.D.** (2001). Anaerobic Psychrophiles from Alaska, Antarctica, and Patagonia: Implications to Possible Life on Mars and Europa. *Proceedings to the International Society for Optical Engineering: Instruments, Methods and Missions for Astrobiology II* . 4495:313.
- Marsic, D., Pikuta, E.V., Hoover, R. and **Ng, J.D.** (2001). Cloning of the 16S ribosomal RNA gene of a psychrophilic bacterium from the Alaskan Fox Permafrost Tunnel. *Proceedings to the International Society for Optical Engineering: Instruments, Methods and Missions for Astrobiology II* . 3755:163-173.
- Green, M.E., Kirkland, N. and **Ng, J.D.** (2001). Effect of a mutation at arginine 301 on the stability, crystal quality and the preliminary crystallographic analysis of recombinant canavalin from *Canavalia ensiformis*. *J. Cryst. Growth* 232:387-398.
- Charron, C., Sauter, C., Zhu, D.W., **Ng, J.D.** Kern, Lorber,B. and Giegé, R. (2001). Packing contacts in orthorhombic and monoclinic crystals of a thermophilic aspartyl-tRNA synthetase favor the hydrophobic regions of the protein. *J. Cryst. Growth* 232: 376-386.
- Zhu, D.W., Lorber, B., Sauter, C., **Ng, J.D.**, Benas, P., Le Grimellec, C. and Giege, R. (2001). Growth kinetics, diffraction properties, and effect of agarose on the stability of a novel crystal form of T. thermophilus aspartyl-tRNA synthetase-1 *Acta Crystallographica Section D. Acta Cryst. D57*, 552-558.
- Roberts, P.H., Zhou, X., Holmes, A., Ranson, H., Small, G., Hemingway, J., **Ng, J.D.**, Chen, L. and Meehan, E.J. (2001). Multi-form crystallization of agGST1-6, a recombinant glutathione S-transferase from a DDT-Resistant strain of *Anopheles gambiae*. *Acta Crystallographica Section D57*:134-136.
- Marsic, D., Hoover, R.B., Gilinchinsky, D.A. and **Ng, J.D.** (2000). Gene cloning of the 18S rRNA for ancient viable moss from the perma frost of northeastern Siberia. *Proceedings to the International Society for Optical Engineering: Instruments, Methods and Missions for Astrobiology II* . 3755:163-173.
- Lorber, B., **Ng, J.D.**, Lautenschlager, P., and Giegé (2000) Growth kinetics and motion of thaumatin crystals during USML-2 and LMS microgravity missions and comparisons with earth controls. *J. Crystal Growth* 208:665-677.
- Lorber, B., Sauter, C., **Ng, J.D.**, Zhu, D.W., Giege, R., Vidal, O., Robert, M.C. and Capelle. (1999). Characterization of protein and virus crystals by quasi-planar wave X-ray topography: a comparison between crystals grown in solution and in agarose. *J. Cryst. Growth* 204:357-368.
- Sauter, C., **Ng, J.**, Lorber, B., Keith, G., Brion, P., Hosseini, M.W., Lehn, J-M and Giegé, R. (1999). Additives for the crystallization of proteins and nucleic acids. *J. Cryst. Growth* 196:365-376
- **Ng, J.D.**, Lorber, B., Giegé, R., Koszelak, S., Day, J., Greenwood, A. and McPherson, A. (1997) Comparative analysis of thaumatin crystal grown on earth and in microgravity. *Acta Crystallogra. D53*, 724-733.

- Koszelak, S., **Ng, J.D.**, Day, J., Ko, T.-P. and McPherson, A. (1997). The crystallographic structure of the protease from *Penicillium cyclopium*. *Biochemistry* 36 : 6597-6604.
- **Ng, J.D.**, Kuznetsov, Y.G., Malkin, A.J., Keith, G., Giegé, R. and McPherson, A. (1997). Visualization of nucleic acid crystal growth by atomic force microscopy. *Nucleic Acid Research* 25 :2582-2588.
- **Ng, J.D.**, Lorber, B., Witz, J., Dietrich-Théobald, A., Kern, D. and Giegé, R. (1996). Crystal growth of macromolecules from precipitation. *J. Crystal Growth* 168:50-62.
- **Ng, J.D.**, Ko, T.-P. and McPherson A. (1993). Cloning, expression and crystallization of jack bean canavalin. *Plant Physiol.* 101:713-738.
- Ko, T.-P., **Ng, J.D.** and McPherson, A. (1993). The three dimensional structure of canavalin from jack bean. *Plant Physiol.* 101:729-744.
- Ko, T.-P., **Ng, J.D.** and McPherson, A. (1993). X-ray structure determination of three crystal forms of canavalin by molecular replacement. *Acta. Crystallogra.* D49:478-489.
- **Ng, J.D.**, Stinchcombe, T.J., Alexander, E and McPherson, A. (1992). The PCR cDNA of Canavalin. *Rice Biotechnology Quarterly* 11:33.
- **Ng, J.D.**, Stinchcombe, T.J., Alexander, E. and McPherson, A. (1992). The PCR cDNA sequence of canavalin reserve protein from *Canavalia ensiformis*. *J. Plant Mol. Biol.* 18:147-149.
- Koszelak, S., Martin, D., **Ng, J.D.** and McPherson, A. (1991). Time lapse microphotography of protein crystal growth. *J. Crystal Growth* 110:117-181.
- **Ng, J.D.** and McPherson, A. (1989). Preliminary crystallographic analysis of proteolytically modified form of *E.coli* Single Stranded DNA Binding Protein. *J. Biomolec. Struct. & Dynam.* 6:1071-1076.
- McPherson, A., Strongin, K., Gibbs, **Ng, J.D.**, Day, J. and Green, M. (1989). The structure of the Vicilin Storage Proteins of Legumes. *J. Cell Biol.* 107:411a#2344.
- Kim, M.H., Nakayama, R., Manos, P., Tomlinson, J.E., Cho, E., **Ng, J.D.** and Holten, K. (1989). Regulation of Apolipoprotein E synthesis and mRNA by diet and hormones. *J. Lipids Res.* 30:663-671.

Recent Presentation in National/International Meetings (2005 – present)

Ng, J.D., Stevens, R.C. and Kuhn P. (2007). Protein crystallization in restricted geometry: advancing old ideas for modern times in structural proteomics. West Coast Protein Crystallization Workshop. Asilomar, Calif. US. (March 11-14, 2007) (Oral) .

Marsic, D., Garriott, O.K., Hudson, J, and **Ng, J.D.** (2006). Characterization of a family B DNA polymerase from the hyperthermophilic marine archaeon *Thermococcus sp.* OGL-20P and preliminary genome sequence analysis. Extremophiles 2006 Conference. Brest, Brittany, France (September 17-21, 2006) (Poster).

Byrne, M. and **Ng, J.D.** (2006). Purification, crystallization, and structure determination of DNA polymerase B from the archaeon *Thermococcus thio-reducens* str. OGL-20. Extremophiles 2006 Conference. Brest, Brittany, France (September 17-21, 2006) (Oral).

Ng, J.D. and Garcia-Ruiz, J.M. (2006). Crystallization for structural genomics. 11th International Conference on Crystallization of Biomacromolecules. International School of Crystallization. Quebec City, Canada (August 16-21, 2006) (Invited Oral).

Hughes R.C. and **Ng, J.D.** (2006). Two men and a genome: a non-automated approach to high throughput cloning for structural genomics. 11th International Conference on Crystallization of Biomacromolecules. Quebec City, Canada (August 16-21, 2006) (Oral).

Gavira, J.A., **Ng, J.D.**, DiGiammarino, E., Tempel, W., Liu, Z.J., Wang, B.C. and Meehan, E.J. (2006). Effects of molecular order and crystal symmetry of ubiquitin conjugation enzymes by protein truncation lead to high resolution structure. 11th International Conference on Crystallization of Biomacromolecules. Quebec City, Canada (August 16-21, 2006) (Poster).

Ng, J.D. (2006). The thrill of victory and the agony of defeat in high throughput protein crystallization. International School on Biological Crystallization, Granada, Spain. (May 22-26, 2006). (Invited Oral)

Ng, J.D., Marsic, D., Hughes, R.C., Garriott, O.K. and Meehan, E. (2006). Structure and function revealed by the nucleotide sequence and genome analysis of a novel hyperthermophilic marine archaeon. The Biology of Genomes, Cold Spring Harbor. (May 10-14, 2006). (Poster)

Ng, J.D. (2006). Counter-diffusion crystallization for structural genomics. Advances in Protein Crystallography. San Francisco, CA (January 26-27)

Pradhan, D. Marsic, D., Garriott, O.K. and **Ng, J.D.** (2005). Isolation of novel alkaliphilic bacteria from Lake Makat, Tanzania and recombinant expression of a new alkaline protease. International Symposium on Extremophiles and their Applications, Toyo University, Tokyo, Japan (November 29-December 2).

Marsic D., Garriott, O.K., Hudson, J. and **Ng, J.D.** (2005). Characterization of a family B DNA polymerase and sequence analysis of a replicative proteins from the hyperthermophilic marine archaeon *Thermococcus sp.* OGL-20P. International Symposium on Extremophiles and their Applications, Toyo University, Tokyo, Japan (November 29-December 2).

Ng, J.D. (2005). Fundamentals of counter-diffusion compared to traditional protein crystallization methods: Application for structural genomics. . 1st Annual UK-Southeast USA Symposium. Athens, Georgia (October 14-16).

Ng, J.D. (2005). Putting the Pedal to the Metal: High Throughput Protocols for Crystallization. XX Congress of the International Union of Crystallography. Florence, Italy (August 22-31).

Ng, J.D. (2005). Crystallonomics, a necessary undertaking for structural genomics. XX Congress of the International Union of Crystallography. Florence, Italy (August 22-31).

Ng, J.D., Liu, J., Lewis, T., Carlton, O., Hardin, S., Hougland, K., Garcia-Ruiz, J.M. DeLucas, L. and Wang, B.C. (2005). Protein crystallization by counter-diffusion using a 96 capillary automated loading device. Protein crystallography in drug discovery. American Crystallographic Association (May 28-June 2).

Ng, J.D., Liu, J., Lewis, T., Carlton, O., Hardin, S., Hougland, K., Gavira, J.A., Garcia-Ruiz, J.M. DeLucas, L. and Wang, B.C. (2005). Protein crystallization by counter-diffusion coupled to pipeline crystallography using a 96 capillary automated loading device. American Crystallographic Association, Orlando, FL May 28-June 2, 2005.

Byrne, M., Marsic, D., Liu, Z.J. Garriott, O.K., Wang, B.C., Meehan, E. and **Ng, J.D.** (2005). Purification, crystallization and structure determination of DNA polymerase B from Archaeon *Thermococcus thioreducens str.* OGL-20. American Crystallographic Association, Orlando, FL May 28-June 2, 2005.

Patents

Ng, J.D., Gavira, J.A., Garcia-Ruiz, J.M., Wells, M., Jenkins, G. Crystallization cassette for the growth and analysis of macromolecular crystals and an associated method. Patent **no. US 7,118,626 B2** Oct 10, 2006.

Pusey, M.L., Dowell, J., **Ng, J.D.** and Chittur, K. (2007) Nucleic Acid Detector and Method of Detecting Targets within a Sample. Ref. no. 038470/249510 (Patent Pending)

Selected Synergistic Activities

Organizing member of the 11th International Conference on the Crystallization of Biological Macromolecules (August 2006). Montreal, Canada.

Instructor for the 10th International Conference on the Crystallization of Biological Macromolecules Workshop, Beijing, China (June, 2004) .

Assigned Co-editor for the Proceedings to 10th International Conference on the Crystallization of Biological Macromolecules to be published in Acta Crystallographica Section D. (May 2004).

Extremophile Workshop Coordinator for the American Society for Gravitational Biology (ASGB) (November 2003), Huntsville, AL.

Instructor for Crystallization of Biological Macromolecules Workshop, Uppsala University, Sweden (Summer 2003).

Instructor for the 9th International Conference on the Crystallization of Biological Macromolecules Workshop, Jena, Germany (March, 2002) .

Organizer of an NSF supported crystallization workshop in the University of South Alabama (May 2001).

Instructor for the EMBO Practical Course on "Crystallogenesis of Biological Macromolecules" Institut de Biologie Moleculaire & Cellulaire, Strasbourg, FRANCE September 1-14, 2000.

Classes Taught

BYS 219 Genetics, 3 credits (Student contact hours: 4.5h/week).

BYS/CH 361 General Biochemistry I, 3 credits (*Student contact hours: 4.5h/week*).

BYS/CH 362 General Biochemistry Lab I, 1 credit (*Student contact hours: 6h/week*).

BYS/CH 363 General Biochemistry II, 3 credits. (*Student contact hours: 4.5h/week*).

BYS/CH 365 General Biochemistry Lab II , 1 credit. (*Student contact hours: 6h/week*)

BYS 519 Gene Structure and Function, 3 credits. (*Student contact hours: 5 h/week*)

BYS-548 Graduate Biochemistry, 3 credits (*Student contact hours 5h/week*)

BYS 691/H399 The Origin and Early Evolution of Life: A biological and chemical perspective (developed course), 3 credits. (*Student contact hours: 4h/week*).

BYS 690 Graduate Seminar, 1 credit. (*Student contact hours: 1.5 h/week*).

BYS 691 Special Topics. Analysis of RNA Interactions, 2 credit (*Student contact hours: 3 continuous weeks*)

BYS/CH 780 Biotechnology Seminar, 1 credit. Biotechnology Seminar series (*Student/Speaker contact hours: average 3 hours/week*).

Language Fluency

English

Cantonese

French

Spanish (intermediate skill)