

RENGASWAMI CHANDRASEKARAN

A. GENERAL INFORMATION

1. Academic Record

| <u>Degree Received</u> | <u>Institution</u> | <u>Date</u> |
|-------------------------------|-----------------------------|-------------|
| M.S. (Physics) | University of Madras, India | June 1960 |
| Ph.D. (X-ray Crystallography) | University of Madras, India | August 1966 |

Professional Experience:

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|-------------------|---|
| 10/1999 – 11/1999 | Visiting Professor Tokyo University of Agriculture and Technology, Japan |
| 7/1992 - present | Professor, Department of Food Science Purdue University |
| 7/1987 - 6/1992 | Associate Professor, Department of Food Science Purdue University |
| 7/1986 - 6/1987 | Visiting Associate Professor, Department of Food Science Purdue University |

Professional Memberships:

Institute of Food Technologists
American Crystallographic Association

2. Awards and Honors

| | | |
|-----------|-------------------------------|------|
| Graduate: | General Proficiency 1st Prize | 1960 |
| | Ranked 2nd in University | 1960 |

B. EXCELLENCE IN RESEARCH SCHOLARSHIP AND CREATIVE ENDEAVOR

1. Research Publications

a. Refereed Papers (83 prior to 2000)

84. Janaswamy, S. and Chandrasekaran, R. (2001) Three-dimensional structure of the sodium salt of iota-carrageenan. *Carbohydr. Res.* 335, 181-194.
85. Bian, W., Chandrasekaran, R. and Rinaudo, M. (2002) Molecular structure of the rhamnan-like exocellular polysaccharide RMDP17 from *Sphingomonas paucimobilis*. *Carbohydr. Res.* 337, 45-56.
86. Bian, W., Chandrasekaran, R. and Ogawa, K. (2002) X-ray structure analysis of the sodium salt of bejieran. *Carbohydr. Res.* 337, 305-314.

87. Janaswamy, S. and Chandrasekaran, R. (2002) Effect of calcium ions on the organization of iota-carrageenan helices: an X-ray investigation. *Carbohydr. Res.* 337, 523-535.
88. Chandrasekaran, R., Janaswamy, S. and Bian, W. (2002) Interactions of cations and water molecules with polysaccharide helices in oriented fibers and correlation with rheological properties. *Polymer Reprints* 43(1), 193-94.
89. Chandrasekaran, R. and Janaswamy, S. (2002) Morphology of Western larch arabinogalactan. *Carbohydr. Res.* 337, 2211-2222.
90. Chandrasekaran, R., Janaswamy, S. and Morris, V.J. (2003) Acetan:glucomannan interactions—a molecular modeling study. *Carbohydr. Res.* 338, 2889-2898.
91. Janaswamy, S. and Chandrasekaran, R. (2005) Polysaccharide structures from powder diffraction data: I. Molecular models of arabinan. *Carbohydr. Res.* 340, 835-839.
92. Tandjung, A.S., Janaswamy, S., Chandrasekaran, R., Aboubacar, A. and Hamaker, B.R. (2005) Role of the pericarp cellulose matrix as a moisture barrier in microwaveable popcorn. *Biomacromolecules* 6, 1654-1660.
93. Janaswamy, S. and Chandrasekaran, R. (2005) Cation-induced polymorphism in iota-carrageenan. *Carbohydr. Polym.* 60, 499-505.
94. Han, X.-Z., Ao, Z., Jane, J.-L., Janaswamy, S., Chandrasekaran, R. and Hamaker, B.R. (2006) Development of a low glycemic maize starch: Preparation and characterization. *Biomacromolecules* 7, 1162-1168.
95. Janaswamy, S. and Chandrasekaran, R. (2006) Sodium iota-carrageenan: A paradigm of polymorphism and pseudopolymorphism. *Macromolecules* 39, 3345-3349.
96. Janaswamy, S. and Chandrasekaran, R. (2008) Heterogeneity in iota-carrageenan molecular structure: insights for polymorph II→III transition in the presence of calcium ions. *Carbohydr. Res.* 343, 364-373.
97. Chandrasekaran, R. and S. Janaswamy. (2008) Polysaccharide architecture and functionality. *Chemistry, Physics and Biology in Macromolecular Science* (Ed. T. Sato, Osaka University Press, Japan), pp. 147-158.
98. Chandrasekaran, R. and Stubbs, G. (2012) Fibre diffraction. *International Tables for Crystallography, Volume F, Crystallography of Biological Macromolecules*, 2nd ed., (Eds. E. Arnold, D. M. Himmel and M. G. Rossmann, Chichester, Wiley), ch. 19.5, pp. 583-592.

b. Research Abstracts (31 prior to 2002)

32. Chandrasekaran, R. and Janaswamy, S. (2002) Structural roles of cations and water molecules on the rheological properties of the polysaccharides iota-carrageenan and RMDP17. XXI International Carbohydrate Symposium, Cairns, Australia.
33. Tandjung, A.S., Janaswamy, S., Chandrasekaran, R. and Hamaker, B.R. (2003) Inherent factors in popcorn pericarp affecting moisture loss during long-term storage and microwaving. American Association of Cereal Chemists Annual Meeting, Portland, Oregon.

34. Han, X.Z., Ao, Z.H., Janaswamy, S., Jane, J.L., Chandrasekaran, R. and Hamaker, B.R. (2004) A low glycemic functional maize starch and investigation of its molecular structure. American Association of Cereal Chemists Annual Meeting, San Diego, California.
 35. Janaswamy, S., Chandrasekaran, R. and Morris, V.J. (2004) Molecular details of the acetan:glucomannan complex – X-ray and modeling study, *FiberNet* Fiber Diffraction Workshop, Argonne National Laboratory, Chicago, Illinois.
 36. Janaswamy, S. and Chandrasekaran, R. (2005) Polysaccharide structures from powder diffraction data. American Crystallographic Association Annual Meeting, Orlando, Florida.
 37. Janaswamy, S. and Chandrasekaran, R. (2006) Polymorphic and pseudopolymorphic behavior of the sodium salt of iota-carrageenan, *FiberNet* Fiber Diffraction Workshop, Fall Creek Falls State Park, Tennessee.
 38. Janaswamy, S. and Chandrasekaran, R. (2006) Sheet formation from arabinan association: results from powder diffraction data, *FiberNet* Fiber Diffraction Workshop, Fall Creek Falls State Park, Tennessee.
 39. Chandrasekaran R. and Janaswamy, S. (2008) Iota-carrageenan: A paradigm of cation dependent polymorphism, pseudopolymorphism and molecular heterogeneity. American Crystallographic Association annual meeting, Knoxville, Tennessee.
 40. Janaswamy, S. and Chandrasekaran, R. (2008) Polysaccharide structures: A heuristic journey from laboratory sources to synchrotron radiation. American Crystallographic Association annual meeting, Knoxville, Tennessee.
 41. Janaswamy, S. and Chandrasekaran, R. (2009) New thoughts on old kappa-carrageenan molecular structure. *FiberNet* Fiber Diffraction Workshop, Argonne National Laboratory, Chicago, Illinois.
- c. Other Publications (16 prior to 1990)**
17. Chandrasekaran, R., Lee, E.J., Radha, A. and Thailambal, V.G. (1992) Correlation of molecular architectures with physical properties of gellan related polymers in *Frontiers in Carbohydrate Research* -2. Ed. R. Chandrasekaran, Elsevier, New York. pp. 65-84.
 18. Chandrasekaran, R., Ed. (1992) *Frontiers in Carbohydrate Research* -2. Elsevier, New York, pp. 1-269.
 19. Chandrasekaran, R. (1995) Impact of x-ray diffraction on molecular architectures of polycrystalline biopolymers in *Structural Biology - Four Decades In Retrospect & Prospects*. Indian National Science Academy Diamond Jubilee Seminar, Madras, India. pp. 29-34.
 20. Chandrasekaran, R. (1997) Molecular architecture of polysaccharide helices in oriented fibers. *Adv. Carbohydr. Chem. Biochem.* 52, 311-439.
 21. Chandrasekaran, R. (1998) Book review on *An Introduction to Hydrogen Bonding*, G.A. Jeffrey, Oxford University Press. *Carbohydr. Res.* 312, 239-240.

22. Rao, V.S.R., Qasba, P.K., Balaji, P.V. and Chandrasekaran, R., Eds. (1998) *Conformation of Carbohydrates*. Harwood Academic Publishers, Amsterdam, pp. 1-359.
23. Chandrasekaran, R. (1998) X-ray diffraction of food polysaccharides. *Adv. Food Nutrition Res.* 42, 131-210.
- 2. Invited Lectures Presented at Regional, National, and International Society Meetings and/or Educational Institutions (60 prior to 2002)**
61. "Interactions of cations and water molecules with polysaccharide helices in oriented fibers and correlation with rheological properties." 223rd American Chemical Society Annula Meeting, Orlando, Florida, April 2002.
62. "Molecular origin of the physical properties of gelling and non-gelling polysaccharides." Miami Valley Laboratories, The Procter & Gamble Company, Cincinnati, Ohio, September 2002.
63. "Molecular origins of physical properties of gelling and non-gelling polysaccharides." American Association of Cereal Chemists Annual Meeting, Portland, Oregon, October 2003.
64. "Fiber diffraction and biopolymer architecture." *FiberNet* Fiber Diffraction Workshop, Argonne National Laboratory, Chicago, Illinois, October 2004.
65. "Specimen preparation in fiber crystallography." *FiberNet* Fiber Diffraction Workshop, Argonne National Laboratory, Chicago, Illinois, October 2004.
66. "Neutron diffraction analysis of the sodium salt of iota-carrageenan." American Crystallographic Association Annual Meeting, Orlando, Florida, June 2005.
67. "Polysaccharides: Structures and functionality." 2006 Food Science Forum, Southern Yangtze University, Wuxi, China, May 2006.
68. "X-ray Diffraction: Starch architecture and crystallinity." School of Food Science and Technology, Southern Yangtze University, Wuxi, China, May 2006.
69. "Food Science at Purdue University." Pepsico International, Shanghai, China, May 2006.
70. "Polysaccharides: Paradigms or puzzles?" *FiberNet* Fiber Diffraction Workshop, Fall Creek Falls State Park, Tennessee, August 2006.
71. "Fiber diffraction, molecular modeling and polysaccharide architecture." Osaka Prefecture University, Osaka, Japan, February 2007.
72. "Polysaccharide architecture and functionality." Osaka University Macromolecular Symposium, Osaka, Japan, February 2007.
73. "The ABCs of polysaccharide gels." In Vitro Biology Annual Meeting, Indianapolis, Indiana, June 2007.
74. "Puzzling Polysaccharides – De-mystifying Their Three-dimensional Structures." (with S. Janaswamy) Institute of Food Technologists Annual Meeting, New Orleans, June 2011.

75. "Polysaccharide architecture and structure-function relationships - Past, present and future" 11th International Hydrocolloids Conference, May 2012.

3. Research Personnel Involvement

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|--------------------------------------|-----------------|
| Advisory Committee Chair (past): | 3 Ph.D., 3 M.S. |
| Advisory Committee Member (past): | 4 Ph.D., 5 M.S. |
| Advisory Committee Member (present): | 1 M.S. |
| Post-doctoral scientists (past): | 3 |

4. Research Grants and Awards Since 1995

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| 1. Gum Industry "Molecular Modeling Studies on Industrially Useful Polysaccharides" | 1995 – 1997 |
| 2. Packaging Corporation "X-ray Analysis of Polysaccharides" | 1995 |
| 3. Cereal Company "Molecular Modeling Studies on Vitamin-Vitamin and Carbohydrate-Vitamin Interactions" | 1995 – 1996 |
| 4. Cereal Company "Molecular Modeling Studies on Vitamin-Amino Acid Carbohydrate Interactions in Ready-To-Eat Cereals" | 1997 – 2000 |
| 5. Industrial Consortium of the Whistler Center for Carbohydrate Research "Molecular Architecture of Polysaccharides" | 2001 – |

5. Other Evidence of National or International Recognition

1. Referee for the following international journals:

Acta Crystallographica
Biophysical Journal
Biopolymers
Carbohydrate Research
Journal of American Chemical Society
Journal of Applied Crystallography
Journal of Biomolecular Structure and Dynamics
Journal of Carbohydrate Chemistry
Journal of Molecular Biology
Journal of Polymer Science
LWT-Food Science and Technology
Macromolecules
Nucleic Acids Research
Protoplasma
Virology

2. Reviewer of grant proposals for the following U.S. Federal Agencies
Department of Agriculture
Department of Energy
National Institutes of Health
National Science Foundation
3. Study Section Member of the National Institutes of Health, 1991 – 2000, 2006.
4. Appointed Member of the Editorial Board of Carbohydrate Research 1996 – 2003.
5. Guest Editor of *Carbohydrate Polymers*, Issue 3, volume 41, 2000.

C. EXCELLENCE IN TEACHING

1. FS 631 Polysaccharide Structure and Function, 3 credit, team taught 11 times since 1987, 6-8 students/class
2. FS 690D Conformation of Polysaccharides, 2 credit, team taught, Spring 2008, 2 students.
3. FS 632 Laboratory in X-ray Fiber Diffraction, 2 credit, taught 13 times
4. FS 684 Food Science Seminar, 1 credit, taught 20 times, up to 12 students/class
5. FS 201 Problem Solving Using Mathematics (pass/fail), taught 5 times, 9-11 students/class

D. EXCELLENCE IN EXTENSION, SERVICE AND UNIVERSITY OUTREACH ACTIVITIES

1. University or Departmental Administrative Services

- A. Department:
Graduate Committee 1987 – 1995, 1997 – 2003 –
Graduate Committee Chair
 - B. College of Agriculture:
Graduate Council 2003 –
Graduate Council Chair 2006 –2008
 - C. University:
Senate 1995 – 1998
Faculty Affairs Committee 1995 – 1998
Faculty Censure and Dismissal Procedures Committee 1998 – 2001
Faculty Representative of Spring Commencement 1988, 1994, 1996, 2004
Faculty Representative of Summer Commencement 2001
Office of the Interdisciplinary Graduate Program 2004 –
Graduate Council 2006 – 2009
- 2. Offices Held in State, National, or International Societies**
- | | |
|---|--------------------------|
| President, Hoosier Chapter of Phi Tau Sigma | 1990 – 1991, 2005 – 2007 |
| Vice-President, Hoosier Chapter of Phi Tau Sigma | 2007 – |
| Chairman, Special Interest Group on Fiber Diffraction, American Crystallographic Association | 1992 – 1993 |

3. Participation in Conferences, Schools, Workshops, Short Courses

- A. Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research -1: Food Applications, West Lafayette, Indiana, September 1988.
- B. Organizer and Session Chairman for the Workshop on Fiber Diffraction from Biological Macromolecules, Fall Creek Falls, Tennessee, May 1989.
- C. Principal Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research -2, West Lafayette, Indiana, May 1990.
- D. Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research -3, West Lafayette, Indiana, April 1992.
- E. Organizer and Chairman for the Fiber Diffraction Session, American Crystallographic Association Annual Meeting, Albuquerque, New Mexico, May 1993.
- F. Organizer and Session Chairman for the Second Workshop on Fiber Diffraction from Biological Macromolecules, Spencer, Indiana, June 1993.
- G. Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research 4, West Lafayette, Indiana, May 1994.
- H. Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research 5, West Lafayette, Indiana, May 1996.
- I. Organizer and Session Chairman for the International Conference Frontiers in Carbohydrate Research 6, West Lafayette, Indiana, May 1999.
- J. Lecturer on Polysaccharide architecture and functionality, Annual Short Course for Industry participants, Whistler Center for Carbohydrate Research, Purdue University, 2006 – 2012.
- K. Session Chairman for the 11th International Hydrocolloids Conference, Purdue University, west Lafayette, Indiana, May 2012.