

CURRICULUM VITAE  
**Champa Sengupta-Gopalan**  
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(January, 2007)

**1. GENERAL INFORMATION:**

**Current Position:**

Professor, Dept of Plant & Environmental Sciences, New Mexico State University  
Graduate Program in Molecular Biology

**University Education:**

1978 Ph.D. in Botany at Ohio State University  
1972 M.S. in Botany at the University of Kalyani, India  
1969 B.S. in Biology at the University of Jodhpur, India

**Other Positions held**

07/78 - 05/80	Postdoctoral Research Associate, Department of Biology, McGill University, CANADA
05/80 - 12/81	Postdoctoral Research Associate, Department of Pharmacology, Stanford University School of Medicine, Stanford
02/82 - 01/85	Research Scientist, Agrigenetics Advanced Research Division, Madison, WI
01/85 - 05/85	Research Scientist, International Plant Research Institute, San Carlos, CA
06/85 - 06/92	Associate Professor, Dept. of Agron & Hort/Mol Bio Grad program
06/92 - present	Professor, Dept. of Plant & Environ Sciences/Mol Bio Grad program

**Honors/Awards**

Outstanding Research Lecturer, New Mexico State Univ., 1988-1989.  
Distinguished Researcher Award, College of Agriculture, New Mexico State University, 1993-1994.  
Distinguished Teaching award, College of Agriculture, New Mexico State University, 1998.  
Invited Speaker at several International meetings on N<sub>2</sub>-Fixation and Plant Mol. Biol.  
Donald Roush, Excellence in Teaching award, New Mexico State University, 1998.  
Outstanding Professor, College of Agriculture, New Mexico State University, 2006

**Other Experience and Professional Memberships**

1998-2001	Monitoring Editor, Plant Physiology,
1999-2003	Monitoring Editor, Plant Biotechnology
1995-present	Scientific advisor, Southwest Consortium for plant genetics and desert adaptation
1995	Organiser, Zia Symposium at NMSU on Plant Molecular Biology
1999	Co-Organiser, Zia Symposium at NMSU on quantifying and engineering metabolism in plants
2000 - 2003	Chair, Westhafer Award Committee, NMSU
1987 - present	Faculty mentor, Minority student research programs (MARC, MBRS, RISE, AMP & Bridges) – Have mentored ~50 undergraduate students)
2000 - present	Faculty mentor, NSF funded AGEP program. (Have been the major advisor for 4 PhD AGEP students)
2001- present	Co-investigator, NSF funded ADVANCE program.
2004 – present	Co-investigator, NSF funded CREST program

## 2. RESEARCH:

### i. Selected publications (since 1983; Total ~60)

**Murai, N., D.W. Sutton, M.G. Murray, J.L. Slightom, D.J. Merlo, N.A. Reichert, C. Sengupta-Gopalan, C.A. Stock, R.F. Barker, J.D. Kemp and T.C. Hall.** 1983. b-Phaseolin gene from bean is expressed after transfer to sunflower via tumor-inducing plasmid vectors. *Science* 222:476-482.

**Hoffman, L.M., C. Sengupta-Gopalan and H.E. Paaren.** 1984. Structure of soybean Kunitz inhibitor mRNA determined from cDNA by using oligodeoxy-nucleotide primers. *Plant Mol. Biol.* 3:111-117.

**Sengupta-Gopalan, C., N.C. Reichert, R.F. Barker, T.C. Hall, and J.D. Kemp.** 1985. Developmentally regulated expression of the bean beta phaseolin gene in tobacco seeds. *Proc. Natl. Acad. Sci.* 82: 3320-3324.

**Hall, T.C., N.A. Reichert, C. Sengupta-Gopalan, J.H. Cramer, K. Lea, R.F. Barker, J.L. Slightom, R. Klassey and J.D. Kemp.** 1985. Regulation of bean-phaseolin gene expression in yeast and tobacco seed. In: *Molecular Form and Function of the Plant Genome*. Vloten-Dolting L. et al., eds., Plenum Publishing Corp., pp. 517-529.

**Sengupta-Gopalan, C. and J.W. Pitas.** 1985. Use of specific cDNA clones as molecular probes for the study of expression of nodulin genes in nodule development of soybeans. In: *Advances in Molecular Genetics of the Bacteria-Plant Interaction*. Szalay, A.A. and Legocki, R.P., eds., Cornell University, Publishers, pp. 80-84.

**Barton, C., L. Yang, M. Galvin, C. Sengupta-Gopalan and T. Borelli.** 1986. Isolation of the SHRUNKEN-2 and BRITTLE-2 genes from maize. In: *Regulation of carbon and nitrogen reduction and utilization in maize*. Shannon, J.C. et al., eds., ASPP publication, pp. 363-365.

**Sengupta-Gopalan, C., J.W. Pitas, D. Thompson and L. Hoffman.** 1986. Expression of host genes during root nodule development in soybeans. *Mol. Gen. Genetics* 203:410-421.

**Sengupta-Gopalan, C. and J.W. Pitas.** 1986. Expression of nodule specific glutamine synthetase genes during nodule development in soybeans. *Plant Mol. Biol.* 7:189-199.

**Mathews, A., Kosslak, R.M., Sengupta-Gopalan, C., Appelbaum, E., Carroll, B.J. and P.M. Gresshoff.** 1989. Biological characterization of root exudates and extracts from non-nodulating and supernodulating soybean mutants. *Molecular Plant-Microbe Interactions* 2:283-290.

**Nirunsuksiri, W., and C. Sengupta-Gopalan.** 1990. Characterization of a novel nodulin gene in soybean that shares sequence similarity to the gene for nodulin-24. *Plant Mol Biol* 15: 835-849.

**Richter, H.R., Sandal, N.N., Marcker, K.A., and C. Sengupta-Gopalan.** 1991. Characterization and genomic organization of a highly expressed late nodulin gene subfamily in soybeans. *Mol Gen Genet* 229: 445-452.

- Estabrook, E., and C. Sengupta-Gopalan.** 1991. Specific genes for phenylalanine ammonia lyase and chalcone synthase families are induced during the early events of the *Glycine max-Bradyrhizobium japonicum* symbiosis. *Plant Cell* 3:299-308.
- Bagga, S., D.S. Sutton, J.D. Kemp, and C. Sengupta-Gopalan.** 1992. The constitutive expression of the bean seed storage protein beta-phaseolin gene in different tissues of transgenic alfalfa does not ensure phaseolin accumulation in non-seed tissues. *Plant Mol. Biol.* 19: 951-958.
- Temple, S.J., T.J. Knight, P.J. Unkefer and C. Sengupta-Gopalan.** 1993. Modulation of glutamine synthetase gene expression in tobacco by the introduction of an alfalfa glutamine synthetase gene in sense and antisense orientation: molecular and biochemical analysis. *Mol. Gen. Genet.* 236:315-325.
- Roche, D., S. J. Temple and C. Sengupta-Gopalan.** 1993. Two classes of differentially regulated glutamine synthetase genes are expressed in the soybean nodule: a nodule-specific class and a constitutively expressed class. *Plant Mol. Biol* 22:971-983.
- Temple, S.J., S. Bagga and C. Sengupta-Gopalan.** 1994. Can glutamine synthetase activity levels be modulated in transgenic plants by the use of recombinant DNA technology? *Biochemical Society Transactions*, 22(4):915-920.
- Temple, S. J. Heard, J., Dunn K. and Sengupta-Gopalan, C.** 1995. Glutamine synthetase gene expression in alfalfa nodules: In situ localization of transcripts corresponding to two classes of GS genes. *Mol. Plant Microbe Inter.* 8:218-227.
- Bagga, S. Adams, H., Kemp, J. D. and Sengupta-Gopalan, C.** 1995. Accumulation of the 15kD zein protein in novel protein bodies in transgenic tobacco. *Plant Physiol.* 107 (1):13-23.
- Temple, S.J., S. Bagga and C. Sengupta-Gopalan.** 1995. Regulation and functional analysis of glutamine synthetase genes in legumes. In: *Nitrogen Fixation: Fundamentals and Applications.* (Eds: Tikhonovitch, I.A., Provorov, N.I., Romanov, V.I., and W.E. Newton), Kluwer Acad Press. 545-550.
- Temple, S.J., Kunjibettu, S. and Sengupta-Gopalan C.** 1996. Total glutamine synthetase activity during nodule development in soybeans is controlled at the level of transcription and and holoprotein turnover. *Plant Physiol.* 112:1723-1733.
- Potenza, C.L., Thomas, S.H. Higgins, E.A. Sengupta-Gopalan, C.** 1996. Early root response to *Meloidogyne incognita* in Resistant and Susceptible Alfalfa Cultivars. *Journal of Nematology.* 28:475-484.
- Temple, S.J. and C. Sengupta-Gopalan** (1997). Manipulating amino acid biosynthesis. In, *Engineering improved carbon and nitrogen use efficiency in higher plants*, (ed. C. Foyer and P. Quick): Taylor and Francis. pp 155-177.
- Bagga, S., F. Rodriguez, J.D. Kemp and C. Sengupta-Gopalan.** (1997). Co-expression of the maize beta- and delta- zein genes results in stable accumulation of the delta- zein in ER derived protein bodies formed by the beta-zein. *Plant Cell* 9:1683-1696.

**Bagga, S., S.J. Temple, J.D. Kemp and C. Sengupta-Gopalan.** (1997). A genetic engineering approach for improving protein quality of forage legumes. *Plant Mol. Biology and Biotechnology*. KK: Tewari and G.S. Singhal (eds). Narosa Publishing House. pp 305-319.

**Temple, S.J., S. Bagga and C. Sengupta-Gopalan.** (1998). Down regulation of specific members of the glutamine synthetase gene family in alfalfa by antisense RNA technology. *Plant Mol. Biol.* 37: 535-547.

**Galili, G., Sengupta-Gopalan, C. and Ceriotti, A.** (1998) The endoplasmic reticulum of plant cells and its role in maturation of secretory proteins and biogenesis of oil bodies. *Plant Mol Biol.* Invited review. *Plant Mol. Biol.* 38: 1-29.

**Ortega, J. L., Temple, S.J., Bagga, S., and C. Sengupta-Gopalan.** (1999) Constitutive and nodule-specific over-expression of cytosolic glutamine synthetase (GS<sub>1</sub>) genes in alfalfa. *High lights on Nitrogen Fixation Research*. Eds., Martinez and Hernandez. Plenum Pub. pp 17-22.

**Ortega, J.L., Roche, D., and C. Sengupta-Gopalan.** (1999) Oxidative turnover of soybean root glutamine synthetase: *in vitro* and *in vivo* studies. *Plant Physiology* 119: 1483-1495.

**Ortega, J.L., Temple, S.J., and C. Sengupta-Gopalan.** (2001) Constitutive overexpression of cytosolic glutamine synthetase (GS<sub>1</sub>) gene in transgenic alfalfa demonstrates that GS<sub>1</sub> may be regulated both at the level of RNA and protein turnover. *Plant Physiol* 126:109-121.

**Potenza, C., Thomas, S., and C. Sengupta-Gopalan.** (2001) Genes induced during early response to *Meloidogyne incognita* in the roots of resistant and susceptible alfalfa cultivars. *Plant Science* 162:289-299.

**Morey, K., Ortega, J.L., and Sengupta-Gopalan, C.** (2002) Cytosolic glutamine synthetase in soybean (*Glycine max*) is encoded by a multigene family and the members are regulated in an organ-specific and developmental manner. *Plant Physiol.* 128: 182-193.

**Potenza, C., Aleman, L., and C. Sengupta-Gopalan.** (2004) Targeting transgene expression in Research, Agricultural and Environmental Applications: Promoters Used in Plant Transformation. *In Vitro Cellular and Developmental Biology – Plant* 40:1-22.

**Bagga, S., Armendaris, A., Endres, M., Klypina, N., Ray, I.M., Sutton, D., Kemp, J.D., and Sengupta-Gopalan, C.** (2004) Genetic engineering for ruminal stable high methionine protein in alfalfa. *Plant Science* 106: 273-283.

**Ortega, J.L., Temple, S., Bagga, S., and C. Sengupta-Gopalan.** (2004) Constitutive overexpression of cytosolic glutamine synthetase in *Lotus japonicus* is accompanied by a significant increase in plant biomass and protein content. *Planta* 219:807-818.

**Zozaya, M., Potenza, C., Ortega, J.L., and C. Sengupta-Gopalan.** (2005) Nitrogen and metabolic regulation of the expression of plastidic glutamine synthetase in alfalfa (*Medicago sativa*) *Plant Science* 168:1041-1052.

**Bagga, S., Potenza, C., Ross, J., Martin, M., Leustek, T., and C. Sengupta-Gopalan.** (2005) Inc reasing methionine levels in alfalfa by co-expression of genes for cystathionine gamma synthase, a key enzyme in methionine biosynthesis and the methionine rich zein proteins. *In Vitro Cellular and Developmental Biology – Plant* 41: 731-741.

**Hinchliffe, D.J., Lu, Y., Potenza, C., Sengupta-Gopalan, C., Cantrell, R.G., and Zhang, J.** (2005). Resistance gene analogue markers are mapped to homoleologous chromosomes in cultivated tetraploid cotton. *Theoretical and Applied Genetics* 110: 1074-1085

**Ortega, J.L., Moguel-Esponda, S., Potenza, C. and C.Sengupta-Gopalan.** (2006) The 3'-untranslated region of the cytosolic form of glutamine synthetase from soybean contains regulatory elements that alter message stability and translational efficiency. *Plant J.* 45:832-846.

**Zhang, J., Waddell, C., Sengupta-Gopalan, C., Potenza, C., and Cantrell, R.G.** (2006). Relationships between root-knot nematode resistance and plant growth in upland cotton: galling index as a criterion. *Crop Sci.* 1581-1586.

**Zhang, J., Waddell, C., Sengupta-Gopalan, C., Potenza, C., Cantrell, R.G.** 2007. Diallel analysis of root-knot nematode resistance based on galling index in upland cotton. *Plant Breeding* 126 (2), 164–168.

**Bagga, S., and Sengupta-Gopalan, C.** 2006. The road less traveled – Chile pepper Biotechnology ... Challenges and Encounters. *The Chile Pepper Institute newsletter* 18:1-2.

**Sengupta-Gopalan, C., Bagga, S., Ortega, J.L. and Potenza, C.** 2007. Genetic Engineering for forage quality in alfalfa. In *New techniques for genetic improvement of legumes. Handbook of New Technologies for Genetic Improvement of Legumes.* ed. B. Kirti. The Haworth Press (In Press)

**Sengupta-Gopalan, C., Bagga, S., Ortega, J.L. and Potenza, C.** 200X. Biotechnology of alfalfa. *Biotechnology in Agriculture and Forestry Vol. 61. Transgenic Crops VI,* ed. E.C. Pua and M.R. Davey; Springer Verlag (In Press)

**Ji, Tieming, Vasudevan, B., Curry, J., Ranjan, D., Sengupta-Gopalan, C. and O'Connell, M.** 2007. Tools for cis-element recognition and phylogenetic tree construction based on conserved sequences. *International Conference on Computers and their Applications.*

**Aleman, L., Uribe, D.J., Ortega, J.L. and Sengupta-Gopalan, C.** 200X. Nodule-enhanced expression of a sucrose phosphgate synthase gene member in alfalfa. *Plant Microbe Interactions* (Submitted)

**Seeger, M., Ortega, J.L., and Sengupta-Gopalan, C.** Comparison of mesophyll-specific over-expression of GS1 to constitutive over-expression in alfalfa, suggests that cytosolic GS can assimilate photorespiratory ammonia. *J of Exp Botany* (Submitted)

ii. **Patents:**

**Bagga, S., Sengupta-Gopalan, C. and Kemp, J.D.** (1997). Co-expression of Proteins. U.S. Patent Application. MPS-410.

iii. **Genbank entries** (last 2 years)

DQ145285

*Medicago sativa* ammonium transporter-like gene, partial sequence

AY584246

*Medicago sativa* nitrate reductase (NIA1) mRNA, partial cds

AY584245

*Medicago sativa* ferredoxin-dependent glutamate synthase mRNA, partial cds

AY851389

*Medicago sativa* leaf sucrose-phosphate synthase mRNA, partial cds

AY651774

*Medicago sativa* sucrose-phosphatase mRNA, partial cds

AY662341

*Medicago sativa* methionine synthase mRNA, partial cds

AY662340

*Medicago sativa* cystathionine gamma synthase mRNA, partial cds

AY560003

*Medicago sativa* S-adenosylmethionine synthase mRNA, complete cds

AY560002

*Medicago sativa* chloroplast cystathionine beta lyase mRNA, partial cds; nuclear gene for chloroplast product

AY560919

*Medicago sativa* chloroplast threonine synthase (TS) mRNA, partial cds; nuclear gene for chloroplast product

AY532173

*Medicago sativa* sucrose-phosphate synthase (SPS) gene, promoter region and partial cds

DQ873666

*Medicago sativa* cystathionine gamma-synthase mRNA, complete cds.

DQ873668

*Medicago sativa* methionine S-methyltransferase mRNA, partial cds.

DQ873667

*Medicago sativa* homocysteine S-methyltransferase mRNA, partial cds.

EF028210

*Medicago sativa* cytosolic glutamine synthetase (GS100) gene, partial sequence.

EF028211

*Medicago sativa* cytosolic glutamine synthetase (GS13) gene, partial sequence.

iv. **Presentations by graduate and undergraduate students at local, national and international meetings** (Last 2 years):

Ahearne T, Garcia D, Sengupta-Gopalan C, (2006) Modulation of PII in transgenic tobacco suggests that PII may have a regulatory role in plants. Undergraduate Research and Creative Arts Symposium (URCAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Ahearne T, Garcia D, Sengupta-Gopalan C, (2006) Modulation of PII in transgenic tobacco suggests that PII may have a regulatory role in plants. Biology Symposium. March 2006. Las Cruces, NM.

Bagga S, Barrow M, Singh J, Sengupta-Gopalan C, (2006) Increasing Methionine Levels in Alfalfa by Modulating Genes in the Methionine Biosynthetic Pathway. 6<sup>th</sup> Annual Research and Creative Activities Fair. October 6, 2006. Las Cruces, NM

Bagga S, Carr C, Sengupta-Gopalan C, (2006) Studies on Transformation and Regeneration in Chile (*Capsicum annuum*). Southwest Consortium on Plant Genetics and Water Resources. August 5-9, 2006. Las Cruces, NM.

Barrow M, Singh J, Bagga S, Sengupta-Gopalan C, (2006) Characterization of the Genes Involved in Methionine Biosynthesis in Alfalfa. Graduate Research and Arts Symposium (GRAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Barrow M, Singh J, Bagga S, Sengupta-Gopalan C, (2006) Increasing Free Methionine Levels in Alfalfa by Modulating Genes in the Methionine Biosynthetic Pathway and the S-Methylmethionine Cycle. Southwest Consortium on Plant Genetics and Water Resources. August 5-9, 2006. Las Cruces, NM.

Barrow M, Singh J, Bagga S, Sengupta-Gopalan C, (2006) Increasing Free Methionine Levels in Alfalfa by Modulating Genes in the Methionine Biosynthetic Pathway and the S-Methylmethionine Cycle. Annual meeting of ASPB. Plant Biology. August 24-26<sup>th</sup> 2006. Boston, MA.

Brown A, Ortega J, Sengupta-Gopalan C, (2006) The 3' Untranslated Region of the Messenger RNA for Glutamine Synthetase Affects Transcripts Stability and Translation Rates in Transgenic Plants. Biology Symposium. March 2006. Las Cruces, NM.

Brown A, Ortega J, Sengupta-Gopalan C, (2006) The 3' Untranslated Region of the Messenger RNA for Glutamine Synthetase Affects Transcripts Stability and Translation Rates in Transgenic Plants. Undergraduate Research and Creative Arts Symposium (URCAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Carr C, Bagga S, Sengupta-Gopalan C, (2006) Studies on Transformation and Regulation in Chile (*Capsicum annuum*). Undergraduate Research and Creative Arts Symposium (URCAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Martinez M, Seger M, Sengupta-Gopalan C, (2006) Biochemical bias for improved performance of alfalfa plants over-expressing GS1 in a photosynthetic cell-specific manner. Undergraduate Research and Creative Arts Symposium (URCAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Ortega J, Sengupta-Gopalan C, (2006) Improving the Efficiency of Nitrogen Assimilation in Legumes by Manipulating Primary Metabolism. 6<sup>th</sup> Annual Research and Creative Activities Fair. October 6, 2006. Las Cruces, NM.

Ortega J, Sengupta-Gopalan C, (2006) The 3' Untranslated Region of the Messenger RNA for Glutamine Synthetase Affects Transcript Stability and Translation Rates in Transgenic Plants. Southwest Consortium on Plant Genetics and Water Resources. August 5-9, 2006. Las Cruces, NM.

Padilla S, Bagga S, Sengupta-Gopalan C, (2006) Genetic Engineering Approach for Increasing Methionine Levels in Alfalfa. Undergraduate Research and Creative Arts Symposium. April 28, 2006. Las Cruces, NM

Padilla S, Bagga S, Sengupta-Gopalan C, (2006) Genetic Engineering Approach for Increasing Methionine Levels in Alfalfa. Annual Biomedical Research Conference for Minority Students. November 8-11. Anaheim, California.

Paul E, Wilson O, Solorzano F, Sengupta-Gopalan C, (2006) Glutamine Synthetase Protein Profile in Senescing Leaves. SACNAS. October 28, 2006. Orlando, FL.

Sanchez A, Bagga S, Barrow M, Sengupta-Gopalan C, (2006) Increasing Free Methionine Levels in Alfalfa by Over-expressing a Key Gene in Methionine Synthesis. Undergraduate Research and Creative Arts Symposium. April 28, 2006. Las Cruces, NM

Sanchez A, Bagga S, Barrow M, Sengupta-Gopalan C, (2006) Increasing Free Methionine Levels in Alfalfa by Over-expressing a Key Gene in Methionine (Met) Synthesis. Annual Biomedical Research Conference for Minority Students. November 8-11. Anaheim, California.

Ji, Tieming, Vasudevan, B., Curry, J., Ranjan, D., Sengupta-Gopalan, C. and O'Connell, M. (2006) Development of Computational Tools for Biological Data Mining: Prediction of Cis-elements in Uncharacterized Genomic Promoter Sequences. 6<sup>th</sup> Annual Research and Creative Activities Fair. October 6, 2006. Las Cruces, NM

Seger M, Sengupta-Gopalan C, (2006) Modulation of Cytosolic Glutamine Synthetase in Alfalfa (*Medicago Sativa*): Mesophyll-Specific vs Constitutive Overexpression. New Mexico Alliance for Graduate Education and the Professoriate Fellowship (AGEP). February 16-17, 2006. Socorro, NM.

Seger M, Martinez M, Sengupta-Gopalan C, (2006) Biochemical and Physiological Effects of Differential Overexpression of Cytosolic Glutamine Synthetase (GS1) in *Medicago sativa* (Alfalfa). Graduate Research and Arts Symposium (GRAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Seger M, Martinez M, Ortega J, Sengupta-Gopalan C, (2006) Modulation of Cytosolic Glutamine Synthetase in Alfalfa (*Medicago Sativa*): Mesophyll-Specific vs Constitutive Overexpression. Southwest Consortium on Plant Genetics and Water Resources. August 5-9<sup>th</sup> 2006. Las Cruces, NM.

Seger M, Martinez M, Ortega J, Sengupta-Gopalan C, (2006) Modulation of Cytosolic Glutamine Synthetase in Alfalfa (*Medicago Sativa*): Mesophyll-Specific vs Constitutive Overexpression. Plant Biology. August 24-26<sup>th</sup> 2006. Boston, MA.

Solorzano F, Paul E, Wilson O, Sengupta-Gopalan C, (2006) Posttranscriptional Regulation of Glutamine Synthetase in Senescencing Leaves. ASPB Meeting. August 24-26<sup>th</sup> 2006. Boston, MA

Solorzano F, Wilson O, Sengupta-Gopalan C, (2006) Regulation of Cytosolic Glutamine Synthetase transsgene in Senescing Tobacco Leaves. MANRRS 21st annual Conference. March 30-April 1 2006. St. Louis, MO

Solorzano F, Sengupta-Gopalan C, (2006) The 3'UTR Mediated Regulation of Cytosolic Glutamine Synthetase. New Mexico Tech GSA Conference. February 16-17, 2006. Socorro, NM

Solorzano F, Paul E, Wilson O, Sengupta-Gopalan C, (2006) Regulation of Cytosolic Glutamine Synthetase in Senescence. Southwest Consortium on Plant Genetics and Water Resources. August 5-9, 2006. Las Cruces, NM.

Wilson O, Solorzano F, Sengupta-Gopalan C, (2006). A Transient Expression System to Study Posttranscriptional Regulation of Glutamine Synthetase in Plants. Undergraduate Research and Creative Arts Symposium (URCAS). April 13<sup>th</sup> 2006. Las Cruces, NM.

Wilson O, Solorzano F, Sengupta-Gopalan C, (2006) A Transient Expression System to Study Posttranscriptional Regulation of Glutamine Synthetase in Plants. Southwest Consortium on Plant Genetics and Water Resources. August 5-9, 2006. Las Cruces, NM.

Bagga, S., Potenza, C., Botello, C. and Sengupta-Gopalan, C. Update on chile transformation. Annual conference of the Chile Task Force, New Mexico State University, Jan 19, 2005.

Bagga, S., Potenza, C., Botello, C., Carr, C., Miller, K., Ross, F., Royball, J., Moore, R., Sy, O., Valera-Montero, L. and Sengupta-Gopalan, C. Chile Conference, New Mexico State University, . Feb, 2005.

Miller, K., Ross, F., Royball, J., Botello, C., Carr, C., Potenza, C., Bagga, S., and Sengupta-Gopalan, C. In Vitro Transformation and Regeneration of Chile (*Capsicum annuum*). . UnderGraduate Research Fair, Honors Program, New Mexico State University April 2005.

Uribe, D., Aleman, L., and Sengupta-Gopalan, C. Identification of different SPS families reveals the complexity of sucrose metabolism in alfalfa. Under Graduate Research Fair, Honors Program, New Mexico State University April 2005.

Quintana, A., Ortega, J.L. and Sengupta-Gopalan, C. Post-transcriptional regulation of glutamine synthetase in alfalfa. Under Graduate Research Fair, Honors Program, New Mexico State University April 2005.

Seger, M. and Sengupta-Gopalan, C. Tissue Specific Overexpression of Cytosolic Glutamine Synthetase in *Medicago sativa* (alfalfa). Minorities in agriculture natural resources and related sciences (MANRRS) conference, 20<sup>th</sup> annual conference, March 31- April 2, 2005. Pittsburgh, Pennsylvania

Solorzano, F. and Sengupta-Gopalan, C. Understanding the Regulation of glutamine Synthetase, a key enzyme in nitrogen assimilation. Minorities in agriculture natural resources and related

sciences (MANRRS) conference, 20<sup>th</sup> annual conference, March 31- April 2, 2005. Pittsburgh, Pennsylvania

Solorzano, F. and Sengupta-Gopalan., C. Regulation of cytosolic glutamine synthetase transgene in senescing tobacco leaves. Graduate research and arts symposium , NMSU, April 15, 2005.

Seeger, M. and Sengupta-Gopalan, C. The Effect of Modulating (Glutamine Synthetase) a Key Enzyme of Nitrogen Metabolism on Plant Performance. Graduate research and arts symposium, NMSU, April 15, 2005.

Carr, C., Miller, K., Podilla, S., Bagga, S., Potenza, C. and Sengupta-Gopalan, C. chile (*Capsicum annuum*) regeneration. Annual meeting, Pathways. May, 2005.

Potenza, C., Ortega, J.L., Solorzano, F., and Sengupta-Gopalan, C. the 3' untranslated region of the soybean *Gmglb1* gene control gene expression at the post-transcriptional and translational level. Society for *In vitro* Biology, Baltimore, Maryland, June, 2005.

Klypina, N., Bagga, S., Potenza, C. Sutton, D., Ghoshroy, S., Hanson, S. and Sengupta-Gopalan, C. The beta-Zein is Not Enough to Stabilize delta-Zein in Transgenic Tissues to High Enough Levels. Society for *In vitro* Biology, Baltimore, Maryland, June, 2005.

Barrow, M., Bagga, S., Potenza, C., and Sengupta-Gopalan, C. Characterization of Cystathionine g-Synthase and Threonine Synthase, two Key enzymes involved in Methionine biosynthesis in alfalfa.

Meeting of the American Society of Plant Biologists. Seattle, WA, July 16-20, 2005.

Sengupta-Gopalan, Carr, C., Ross, F., Potenza, C., and Bagga, S. Studies on transformation and regeneration of chile. 5<sup>th</sup> Annual URC Research and Creative Activities Fair, NMSU. October 7, 2005.

Bagga, S., Ross, J., Potenza, C., Leustek, T. and Sengupta-Gopalan, C. Increasing methionine levels in alfalfa by co-expressing genes for Cystathionine g- synthase, a key enzyme in methionine biosynthesis and the methionine rich zein protein. 5<sup>th</sup> Annual URC Research and Creative Activities Fair, NMSU. October 7, 2005.

Potenza, C., and Sengupta-Gopalan, C. Transgenic approach to decrease oxidative stress in plants. 5<sup>th</sup> Annual URC Research and Creative Activities Fair, NMSU. October 7, 2005.

Ortega, J.L., Potenza, C., Moguel-Esponda, S., Conklin, C., Quintana, A. and Sengupta-Gopalan, C. Improving nitrogen assimilation capability of legumes through the overexpression of cytosolic glutamine synthetase. 5<sup>th</sup> Annual URC Research and Creative Activities Fair, NMSU. October 7, 2005.

#### v. **Research Support**

Active:

#### **NIH, Score Program**

Title: Posttranscriptional regulation of plant glutamine synthetase.

**Southwest Consortium for plant genetics and desert adaptation (USDA).**

Title: Counteracting abiotic salt stress in alfalfa by over-expression of chloroplastic glutamine synthetase (GS2)

**NSF**

Title: Acquisition of a Multi-Instrument High Performance liquid Chromatography System for Metabolomics and Translational Genomics Research and Education.

**New Mexico Chile Association.**

Title: Developing a transformation system for Chile for the purpose of making glyphosate resistant chile

**Chile Research Funds, NMSU**

Title: Developing a chile transformation and regeneration system for genetically engineering resistance to root knot nematodes and Phytophthora

**Office of the Vice-President of Research, NMSU**

Title: Detection and functional analysis of promoter elements of genes involved in N assimilation in plants.

Completed projects: (Past 5 years)

**USDA (NRI)**

Title: Increasing methionine levels in alfalfa

**Forage Genetics**

Title: Isolation and characterization of leaf-specific promoters from alfalfa

**Southwest Consortium for plant genetics and desert adaptation (USDA)**

Title: The antioxidant system of alfalfa root nodules: strategies for reducing oxidative damage during stress

**Southwest Consortium for plant genetics and desert adaptation (USDA).**

Title: A proteomics approach to develop resistance to root knot-nematodes.

**NIH, Score Program**

Title: Cell specific modulation of glutamine synthetase in alfalfa

**Postdoctoral Associates directed, current positions:**

Tom Knight - Professor, Univ of Southern Maine

Rebecca Dickstein - Associate Professor, Univ of North Texas

Sibdas Ghosh - Assoc Prof, Univ of Wisconsin, Whitewater

Stephen Temple - Director – Plant Mol Bio, forage Genetics.

Carol Potenza – Research scientist, ARS

Jose Ortega – Senior science specialist, NMSU

Suman Bagga – Senior science specialist, NMSU

### 3. TEACHING:

#### Courses

Agro/ANSC/Bio/Hort 305	Principles of Genetics
Agro/Hort/MolBio 506	Plant Genetics
Agro/Hort/MolBio 695	Plant Genetic Engineering
Agro/EPPWS/Hort/MolBio530	Plant Physiology: Metabolism; Growth & Development
Biochem/MolBio 545	Molecular Genetics
Bio 398	Research programs
Bio 498	Research programs
Agro/Hort 449	special problems

#### Undergraduate training:

Active participant in the MARC, RISE, AMP and BRIDGES programs catering towards the training of undergraduate students in laboratory research.

#### Undergraduate students trained and their current occupation (last 10 years)

Melanie Ingram	MD
Fabian Rodriguez	MD
Angela Armindaris	Ph.D.
Concha Martinez	DDS
Stephanie Casias	Nursing
Raul Arreola	Pharm D
Naomi Garcia	Resident, Medical School
Jonathan Roybal	Graduate School
Jennifer Mendosa	Graduate School
Joanna Maestas	Graduate School
Amber Kahle	Graduate School
Bettina Brown	Physical therapy School
Kristi Bemis	Researcher
Taryn Early	Graduate School
Monica Chavando	Nursing
Jamie Ross	Veterinary School
Joanna Maestas	Graduate School
Kendra Miller	Veterinary School
Suzanna Tapia	Researcher
Sarah Mount	Graduate School
Victor Vanegas	Graduate School
Robert Moore	Pharmacy School
Robert McGraw	Medical School
Christina Conklin	Medical School
Anita Quintana	Graduate School
Marilyn Gotbetter	Graduate School
Jean Allen	Graduate School
Liliana Carbajal	Graduate School
Dianna Uribe	Graduate School
Gilbert Escamilla	High School teaching
Arianne Carpenter	Pharm D
Timothy Ahearne	Graduate School

Adam Brown

Medical School

Undergraduate students (presently in the lab):

Serina Padilla, Angelica Sanchez, Virginia Lee, Sandra Camarillo, Charlene Carr, Lacy Yazzie, Brad Barrow, Esther Paul, Samantha Clarke.

**Dissertations/Thesis directed in the past five years, Current Positions:**

1. Shawn Collier-Yarnes, Ph.D., 2006. Carbon and Nitrogen metabolism in legume-mycorrhizae interaction. Asst Professor, Central Seattle community college
2. David Garcia-Ibilcieta. Ph.D., 2005. Global regulation of nitrogen metabolism in plants: a role for PII - Postdoctoral fellow, NMSU
3. Lorenzo Aleman, Ph.D., 2005. Unraveling the complexities of sucrose metabolism in alfalfa (*Medicago sativa*): a pursuit to increase sucrose phosphate synthase – Postdoctoral fellow, Texas Tech University
4. Mark Seger, MS, 2005. Modulation of glutamine synthetase: Mesophyll specific versus constitutive over expression – Ph. D. student, NMSU
5. Salvador Moguel-Esponda. Ph.D., 2004. The 3' untranslated region of cytosolic glutamine synthetase gene from soybean (*Glycine max*) mediates stability of its transcript – Post doctoral fellow, University of Nebraska.
6. Robert Moore. MS, 2003. Functional analysis of alfalfa (*Medicago sativa*) green-tissue specific promoters – Pharmacy School, UNM
7. Marcela Zozaya, Ph.D., 2002. Regulation of chloroplastic glutamine synthetase in alfalfa – Research Associate, University of New Orleans.
8. Sarah Higbie, Ph.D. 2002. Analysis of transformed alfalfa overexpressing the genes for manganese superoxide dismutase and ascorbate peroxidase - Asst. prof, St. John's College, Connecticut.

**Present graduate students and their dissertation titles:**

1. Mark Seger, Ph.D. Understanding the signal cascade in the transcriptional regulation of genes encoding key enzymes in carbon and nitrogen metabolism in *Medicago* species.
2. Fernando Solorzano, Ph.D. Transcriptional and posttranscriptional regulation of glutamine synthetase during leaf senescence in soybean and the role of N mobilization in pod fill.
3. Matt Barrow, Ph.D. Regulation of key genes in methionine metabolism in alfalfa.
4. Bindu Vasudevan Simon, Ph.D. Bioinformatic and functional analysis of the gene promoters and the 3' untranslated regions of the two alfalfa cytosolic glutamine synthetase genes.
5. Omar Holguin, Ph.D. Metabolic and biochemical analysis of alfalfa engineered in key steps in methionine metabolism.
6. Olivia Wilson, Ph.D. Isolation and characterization of transcription factors regulating key genes in N assimilation in alfalfa.
7. Martha Martinez, Ph.D. Regulation of the genes encoding sucrose phosphate synthase gene family in *Medicago* species