Curriculum Vitae

Anirban Guha, Ph. D.
Postdoctoral Research Associate
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RESEARCH INTERESTS

I am particularly interested in the consequences of climate change, especially drought, elevated CO_2 and temperature stress, on plant photosynthesis and hydraulic physiology and their acclimation to changing environmental conditions. This includes leaf gas exchange, whole plant water uptake, xylem anatomical traits, hydraulic conductivity of roots and stems, leaf traits and plant phenology and growth dynamics etc.

ACADEMIC DEGREES

2009-2013 PhD at the Department of Plant Sciences, University of Hyderabad (Hyderabad, India)
Degree obtained: **PhD in Plant Sciences**. Thesis title: *Photosynthetic and hydraulic responses in mulberry to drought stress: Patterns, architecture and acclimation*
2006- 2007 M.Phil. in Biotechnology at the Periyar University (Salem, Tamil Nadu, India)
2003-2005 Master of Science (M.Sc.) in Sericulture Technology (specialization in Mulberry Production) at the Central Sericultural Research and Training Institute, Mysore, University of Mysore (Mysore, India)
Dissertation: *Comparison of morphological, biochemical and anatomical responses of some mulberry varieties under two light regimes*
1999-2002 Bachelor of Science (B.Sc.) in Sericulture (major) with Botany and Zoology, University of

RESEARCH & TEACHING EXPERIENCE

05/2016-till date	**Postdoctoral Research Associate**, Oak Ridge National Laboratory, Tennessee
3/2014-3/2016	**Postdoctoral Research Fellow**, IISER, Pune
2013-2014	**Postdoctoral Research Fellow**, Department of Botany, University of Pune
7/2013-9/2013	**Research Associate**, Crop Physiology Laboratory, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India
7/2011-10/2011	**DAAD Exchange Student** at the Westfälische Wilhelms-University (WWU) of Münster, Germany
2011-2013	**Senior Research Fellow** (SRF), Dept of Plant Sciences (University of Hyderabad, India)
2007-2009	**Junior Research Fellow** (JRF), Dept of Plant Sciences (University of Hyderabad, India)
2006-2007	**Senior Research Fellow** (SRF), Regional Sericultural Research Station, Salem (CSB)
2005-2006	**Part-time Lecturer**, Department of Sericulture, Rahara Ramakrishna Mission College, Kolkata
2005-2006	**Guest Lecturer**, Department of Sericulture, Dinabandhu Andrews College, Kolkata

AWARDS, HONOURS & FELLOWSHIPS

2014	National Academy of Sciences of India (NASI) Young Scientist Platinum Jubilee Award 2014
2014	Postdoctoral Fellowship from Indian Institute of Science Education and Research (IISER), Pune
2013	Dr. D.S. Kothari Postdoctoral Fellowship Award from UGC, Govt. of India
2013	Research Associate-ship from ICRISAT, Hyderabad, India
2011	DAAD-NPTI fellowship award for educational visit to Germany under 'New Passage to India' program
2011	Senior Research Fellowship award from Council of Scientific and Industrial Research (CSIR), Govt. of India
2007	Junior Research Fellowship from Department of Science and Technology(DST), Govt. of India
2006	Senior Research Fellowship from Central Silk Board (CSB), Ministry of Textiles, Govt. of India
2005	1st rank in M.Sc. Examination (University of Mysore, 2005)
2002	1st rank in B.Sc. Examination (2002) from University of Calcutta

PUBLICATIONS

International peer-reviewed journals : **14**
National peer-reviewed journals: **3**

Thesis

PhD: Photosynthetic and hydraulic responses in mulberry to drought stress: Patterns, architecture and acclimation.
M.Sc.: Comparison of morphological, biochemical and anatomical responses of some mulberry varieties under two light regimes.

SCIENTIFIC SKILLS

4/2014- 3/2016

Postdoctoral research at Indian Institute of Science Education and Research (IISER), Pune. Working on 'Photosynthetic performance and hydraulic *characteristics in plants grown under soil water stress*'

- leaf gas exchange physiology
- analyses of chl *a* fluorescence signal
- daily transpiration, periodical and total water uptake by plants
- root/stem-wood xylem anatomy
- modulation in xylem structure under short- and long-term water stress

10/2013-3/2014

Postdoctoral research at Department of Botany, University of Pune. Working on '*Leaf hydraulic characteristics in sorghum under drought stress*' (Mentor: Prof. Sujata Bhargava)

- leaf water flux traits and xylem hydraulic capacity
- response of foliar aquaporins
- leaf hydraulic architecture

7/2013-9/2013

Research associate at the Crop Physiology Laboratory, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India (mentor: Dr. Vincent Vadez)

7/2009-4/2013

PhD dissertation research, Photosynthesis and Plant Stress Biology Laboratory (University of Hyderabad, India)
Characterization of photosynthetic leaf gas exchange, photosystem efficiency, leaf water relations, hydraulic acclimation and xylem vessel architecture in drought tolerant mulberry (Morus spp. L) genotypes (Supervisor: Prof. Attipalli R. Reddy)

- field-level screening of genotypes for drought tolerance
- experimental tests for drought tolerance
- field measurements of tree growth, phenology and ecophysiology
- leaf-level physiobiochemical, anatomical and growth measurements (leaf gas exchange, chlorophyll fluorescence, water potential, foliar antioxidant quantification, protein profiling, analyses of leaf hydraulic architecture, specific leaf area etc.)
- field measurements of plant hydraulic conductance and sap flow
- measurements of root, stem-wood and leaf hydraulic architecture and vessel traits
- experience with various equipments for measuring microclimatic and soil conditions
- germplasm maintenance and establishment of field-based experimental setup

7/2011-10/2011

Four months DAAD Exchange Program at Westfälische Wilhelms-University (WWU) of Münster, Germany. Internship at Institute for Biology and Biotechnology of Plants - WWU, Germany on *Characterization of pgr5 knock-out mutant in Chlamydomonas reinhardtii* (Advisor: Prof. M. Hippler)

- methods for chlamydomonas research (culture, subculture and preservation)
- experimental tests with chlamy grown in variable growth conditions (low to high light transitions, iron replete-deplete, autotrophic-heterotrophic and aerobic-anaerobic)
- thylakoid membrane isolation
- immunodetection of photosynthetic and respiratory proteins
- measurements of P700 and low temperature fluorescence emission spectra
- measurements of chlorophyll fluorescence signals

4/2011-7/2013

Research project entitled "*Analysis of leaf gas exchange physiology and hydraulic conductance components in anisohydric mulberry (Morus spp L.) under drought* "
handled under CSIR, Senior research fellowship (Supervisor: Prof. Attipalli R. Reddy)

- field measurements of diurnal leaf gas exchange and OJIP transients
- diurnal leaf and stem water potential
- diurnal sap flow, stomatal conductance to H_2O and foliar ABA content

2/2009-4/2009

Research and practical training in elevated CO_2 experiments and shared responsibility for management of Open Top Chamber CO_2 enrichment systems [advisor: Prof. Attipalli R Reddy, Dept of Plant Sciences (University of Hyderabad, India)]

- experimental tests to characterize tree response to elevated CO_2
- measurements of tree growth, photosynthesis and biomass productivity

- experience with various sensors for measuring microclimate and meteorological conditions in elevated CO_2 experiments
- measurements of carbon contents in above ground biomass
- measuring carbon sequestration capacity per tree in a growth season
- experiments on photoinhibition mitigation under elevated CO_2
- measurements of foliar carbonic anhydrase activity
- comparative analysis of evergreen *versus* deciduous tree species under high CO_2

6/2007-11/2009 Research experience in DST (Department of Science & Technology, Govt. of India) funded research project at University of Hyderabad, India (PI: Prof. Attipalli R Reddy)
Oxidative stress responses to drought stress in different mulberry cultivar

- measurements of foliar/root antioxidants (both enzymatic and non-enzymatic)
- measurements of foliar/root osmoprotectants and photosynthetic pigments
- localization of reactive oxygen species (ROS) in plant tissue using confocal laser scanning microscopy

1/2006-3/2007 Research experience in CSB (Central Silk Board, Govt. of India) funded research project at Soil Analysis Laboratory of Regional Sericultural Research Station (Salem, India)- *Integrated nutrient, pest and disease management of mulberry-Intensive Integrated Farming System (IIFS) in South Indian farmer's participatory sericulture.*

- field work for investigation on various problematic soil conditions of south Indian states
- field experiments for amelioration of problematic soil conditions
- field measurements of soil physical properties
- shared responsibility for establishment of Soil Analysis Laboratory
- routine analyses of several soil samples (physicochemical parameters)

2004-2005 M.Sc. dissertation reserach, Central Sericulural Research & Training Institute (Mysore, India)
Shade-induced morphophysiological, biochemical and anatomical changes in mulberry

- leaf micromorphological and anatomical studies using SEM
- microtomy and histochemical staining of root, stem and leaf samples
- biochemical estimations of foliar pigments, carbohydrates, proteins and nitrogen

SPECIAL TRAINING AND COURSES:

10/9-15/9/2012 Ecophysiology Techniques Workshop, organized by PEPG (Plant Environmental Physiology Group, University of Essex, UK) at Lisbon, Portugal

- Infra-red Gas exchange analysis
- Chlorophyll fluorescence
- Modelling of physiological processes.
- Field imaging of growth and leaf development
- Practical setup of Eddy Covariance
- Eddy Covariance measurements
- Chlorophyll fluorescence imaging
- Combined gas exchange and fluorescence
- Soil moisture measurements

28/8-29/8/2011 Workshop on laboratory organization and coordination, laboratory safety and presentation skills at Westfälische Wilhelms-University (WWU) of Münster, Germany

11/8-12/8/2011 Workshop on photosynthesis at 20th jubilee Photosynthesis Workshop-WWU, Münster, Germany (Organizer: Research group of Prof. M. Hippler)

22/11-26/11/2010 Genomics training Workshop for Quantitative PCR and Micro-array at School of Life Sciences (University of Hyderabad, India)

30/11/-1/12/2008 Workshop on ''Intact Plant Photosynthesis" – A Chlorophyll Fluorescence Workshop at DAVV (Indore, India) [by Prof R. J. Retostrasser (University of Geneva,

	Switzerland) Prof. Govindjee (University of Illinois, Urbana, USA) and Prof. P. K. Mohanty (Regional Plant Resource Centre, Bhubaneswar, India] • measurements of chlorophyll a fluorescence induction kinetics • analysis of fluorescence data using BioAnalyser Software • implications of fluorescence results to understand quantitative changes in photosystem II
2/2006	Training programme in soil, leaf and water analysis at the Soil Science Laboratory of Central Sericultural Research & Training Institute (Mysore, India) • soil, leaf and water sampling techniques • measurements of physical properties of soil (texture, density, water holding capacity) • measurements of physicochemical properties of soil and water (pH, electrical conductivity, soil organic matter, NPK, Ca, Mg, Na and K) • measurements of leaf NPK and C • measurements of cation exchange capacity (CEC) and sodium adsorption ratio (SAR) of soil

SCIENTIFIC SERVICES

Joint supervision of PhD and undergraduate student thesis research (University of Hyderabad & IISER Pune, India).
Writing botanical texts for e-content at postgraduate level (UGC e-PG Pathshala).
Reviewer of a science journal of national repute: Current Science

PUBLICATION LIST

	In Peer Reviewed Journals	Cited by	Year
1	Polyphasic chlorophyll a fluorescence kinetics and leaf protein analyses to track dynamics of photosynthetic performance in mulberry during progressive drought, **A Guha**, D Sengupta, AR Reddy, Journal of Photochemistry and Photobiology B: Biology 119, 71-83 **(IF: 2.96)**	14	2013
2	An integrated diagnostic approach to understand drought tolerance in mulberry (Morus indica L.), **A Guha**, D Sengupta, GK Rasineni, AR Reddy, Flora-Morphology, Distribution, Functional Ecology of Plants 205 (2), 144-151 **(IF: 1.47)**	14	2010
3	Elevated atmospheric CO 2 mitigated photoinhibition in a tropical tree species, Gmelina arborea, GK Rasineni, **A Guha**, AR Reddy, Journal of Photochemistry and Photobiology B: Biology 103 (2), 159-165 **(IF: 2.96)**	10	2011
4	Physiological optimality, allocation trade-offs and antioxidant protection linked to better leaf yield performance in drought exposed mulberry, **A Guha**, D Sengupta, AR Reddy, Journal of the Science of Food and Agriculture 90 (15), 2649-2659 **(IF: 1.71)**	8	2010
5	Drought tolerance in mulberry (Morus spp.): a physiological approach with insights into growth dynamics and leaf yield production, **A Guha**, GK Rasineni, AR Reddy, Experimental Agriculture 46 (04), 471-488 **(IF: 1.08)**	8	2010

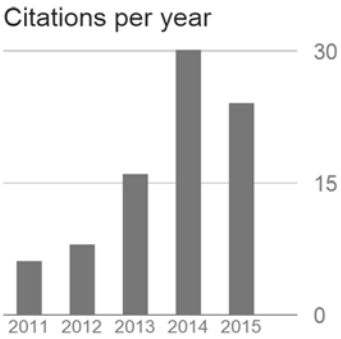
6	Responses of Gmelina arborea, a tropical deciduous tree species, to elevated atmospheric CO 2: growth, biomass productivity and carbon sequestration efficacy, GK Rasineni, **A Guha**, AR Reddy, Plant science 181 (4), 428-438 **(IF: 3.61)**	7	2011
7	Leaf gas exchange physiology in rice genotypes infected with bacterial blight: An attempt to link photosynthesis with disease severity and rice yield, A Kumar, **A Guha**, W Bimolata, AR Reddy, GS Laha, RM Sundaram, ...Australian Journal of Crop Science 7 (1), 32 **(IF: 1.63)**	6	2013
8	Non-enzymatic antioxidative defence in drought-stressed mulberry (Morus indica L.) genotypes, **A Guha**, D Sengupta, GK Rasineni, AR Reddy, Trees 26 (3), 903-918 **(IF: 1.65)**	4	2012
9	Interdependence of plant water status with photosynthetic performance and root defense responses in Vigna radiata (L.) Wilczek under progressive drought stress and recovery, D Sengupta, **A Guha**, AR Reddy, Journal of Photochemistry and Photobiology B: Biology 127, 170-181 **(IF: 2.96)**	3	2013
10	Leaf functional traits and stem wood characteristics influencing biomass productivity of mulberry (Morus spp. L) genotypes grown in short-rotation coppice system, **A Guha**, AR Reddy, BioEnergy Research 6 (2), 547-563 **(IF: 3.54)**	3	2013
11	Paclobutrazol treatment as a potential strategy for higher seed and oil yield in field-grown camelina sativa L. Crantz, S Kumar, S Ghatty, J Satyanarayana, **A Guha**, BSK Chaitanya, AR Reddy, BMC research notes 5 (1), 137	3	2012
12	Leaf gas exchange, water relations and photosystem-II functionality depict anisohydric behavior of drought-stressed mulberry (Morus indica, cv. V1) in the hot semi-arid steppe agroclimate of Southern India, **A Guha**, AR Reddy, Flora-Morphology, Distribution, Functional Ecology of Plants 209 (2), 142-152 **(IF: 1.47)**	2	2014
13	Adaptive anatomical characteristics of leaves of three mulberry genotypes for shade tolerance, AM Babu, **A Guha**, JS Kumar, Indian Journal of Sericulture 45, 76-80	2	2006
14	Elevated CO_2 atmosphere significantly increased photosynthesis and productivity in a fast growing tree species, Gmelina arborea Roxb., GK Rasineni, **A Guha**, AR Reddy, Climate Change and Environmental Sustainability 1 (1), 81-94		2013
15	Soil organic matter: a boon for crops, **A Guha**, GK Rasineni, Science Reporter 46, 21-26		2009
16	Comparative performance of Tephrosia purpurea (Fabaceae) and Sesbania aculeata (Fabaceae) in improving physiochemical properties of soil of mulberry field- A first report., S Masilamani, S Jayaraj, **A Guha**, SMH Quadri, Sericologia 47, 97-104		2007

17 Soil organic matter and its association with soil physicochemical parameters and root growth of mulberry, S Masilamani, SMH Qadri, S Jayaraj, N Dhahira Beevi, **A Guha**, ...Séricologia 47 (2) 2007

PUBLICATION STATISTICS

Citation indices	All	Since 2010
Citations	84	84
h-index	6	6
i10-index	3	3

https://scholar.google.co.in/citations?user=0FniDusAAAAJ&hl=en&oi=ao



CONFERENCE

ORAL PRESENTATIONS

1. **Guha A**. Phenotyping photosynthetic diversity for 'better' photosynthesis. 35th Annual meeting of PTCA (I) & National Symposium on *Advances in Plant Molecular Biology and Biotechnology*, *Session IIIB: Molecular Taxonomy, Diversity, Conservation*, 10-12th March, 2014, IISER, Pune.
2. **Guha A** and Attipalli R. Reddy. Ecophysiological responses of anisohydric mulberry to summer drought at a hot semi-arid steppe experimental site of southern India. *Plant Ecophysiology Techniques Workshop*, Lisbon, Portugal, 10-15th September 2012, organised by Plant Environmental Physiology Group, University of Essex, UK.
3. **Guha A** and Attipalli R. Reddy. Genotypic diversity of photosynthesis in mulberry (*Morus* spp L.): Leaf/stem traits, their intra-relations, interrelations and correlations with photosynthetic performance. *Plant Science Colloquium-2012*, University of Hyderabad, India.

POSTER PRESENTATIONS

1. **Guha A**, Chhajed S. and Barua D. Stem xylem plasticity in sorghum in response to drought: consequences for plant water uptake and growth. National Symposium on *"Environmental Impact on Biodiversity and Plant Development*" Poster Session Participation, Presidency University, Kolkata. (February 19-20, 2015).
2. **Guha A**, Sengupta D and Attipalli R. Reddy. Drought-induced ecophysiological and molecular responses in *Morus indica* to predict anisohydric functionality of trees for future climate change. Conference '*Research Dialogue in the Life Sciences' organized by German Research Foundation (DFG)* at the University of Hyderabad, India (2012).
3. Sengupta D, **Guha A** and Attipalli R. Reddy. Regulatory networks in mungbean (*Vigna radiata*) root system under drought', *Bioquest-2010*, School of Life Sciences, University of Hyderabad, Hyderabad (March, 2008).
4. **Guha A**, Rasineni G. K. and Attipalli R. Reddy. Photosynthetic Leaf gas exchange, radiation use efficiency and chlorophyll fluorescence indices associated with leaf yield in water-limited *Morus* cultivars. *National Symposium on Frontiers in Photobiology* (FIP-2009), BARC, India.
5. **Guha A**. Rasineni G. K. and Attipalli R Reddy. Diffusive resistance to CO_2 as a limitation to net photosynthesis in water-stressed mulberry leaves. International conference "*Photosynthesis in the global perspective*" held in honour of Govindjee, November 27-29, 2008, Devi Ahilya University, Indore, India.

6. **Guha A**, Sengupta D. and Attipalli R. Reddy. Drought-induced oxidative stress in mulberry (*Morus* spp. L), *Bioquest-2008*, School of Life Sciences, University of Hyderabad, Hyderabad (March 15-16th, 2008).

Referees:

Dr. Jeffrey M. Warren
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It is certified that all information given by me above is true to the best of my knowledge.

Date: November, 2016 Anirban Guha