**Curriculum Vitae**

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| **Dr. Narasingarao Palepu PhD** | | |
| **Working address:**  Research Associate – II  School of Chemical Sciences  National Institute of Science Education  and Research (NISER)  Bhubaneswar, Odisha-752050 | **Permanent address:**  Ippagunta Village  Ponnaluru Mandal  Prakasam District  Andhra Pradesh-523109 | **3** |
| **Contact:** Ph. no. 91-7853879669, 91-7655864689  e-mail: [narsingraopalepu@gmail.com](mailto:narsingraopalepu@gmail.com)  Languages known: Telugu, Hindi, English | | |

**Education**

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| **Degree** | **Year** | **Percentage** | **University** |
| Secondary School  Certificate (S.S.C) | March 2002 | 86 | Board of Secondary Education, Andhra Pradesh |
| Intermediate  (Bi. P. C) | May 2004 | 88.6 | Board of Intermediate Education, Andhra Pradesh |
| Bachelor of Science  (Mb. Bt. C) | April 2008 | 77 | Osmania University, Hyderabad |
| Master of Science  (Analytical Chemistry) | April 2010 | 67 | Acharya Nagarjuna University, Guntur |
| PGDCAQM  (Post Graduate Diploma in Chemical Analysis and Quality Management) | September 2011 | 66 | University of Hyderabad, Hyderabad |
| Ph.D.  (Organometallic Chemistry) | March 2017 |  | North-Eastern Hill University, Shillong, Meghalaya |

**Professional experience**

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| **Institute** | **Designation** | **Duration** |
| **National Institute of Science Education and Research (NISER), Bhubaneswar, India** | Post Doctoral Fellow | 3rd Feb 2017 to 31st July 2017 |
| National Post Doctoral Fellow | 1st Aug 2017 to 31st July 2019 |
| Research Associate-II | 11th Sep 2019 and continuing |

**Research Highlights**

**Research work during Post Doc**

**Research projects involved:**

Cryptand based hybrid Calixpyrroles and Calixphyrins: Syntheses, Spectral and Receptor studies ; ii) Contracted and Expanded Porphyrin Analogues with Polycyclic Aromatic Units: Syntheses and Applications

**1. First 3D cage-like normal and N-confused calixbenzophyrins with cation binding property**

Three dimensional normal and N-confused calixbenzophyrins are successfully synthesized from single starting material for the first time and they differ in the connectivity of pyrrole to the *meso* like carbon. The aggregation studies revealed that the macrocycles exhibit AIEE phenomenon. The cation sensing studies of molecules have revealed the cooperative binding towards FeIII and CrIII.



**2. First Cryptand Type 3D Calixbenzopyrroles: Synthesis and structural studies**



Unprecedented cryptand type three dimensional calixbenzopyrroles incorporated with benzene rings in the polypyrrolic macrocycle are explored and their structures are unambiguously determined by spectroscopic and crystallographic studies. Both simple and its expanded higher homologue are isolated successfully

**3.** **Biphenyl embedded Normal and N-confused calixbenzophyrins with NNNN and NNCC cores and organo-Cu(III)/Rh(I),Cu(II) and Co(II) complexes**



Biphenyl embedded contracted and expanded calixbenzophyrin were succefuly synthesized. Contracted carbacalixphyrin exhibit open book shape conformation in its freebase form. The trianionic nature of ligand is effectively utilized for the stabilization of organo-Cu(III) complex through double C-H activation of two phenylic protons and deprotonation of the pyrrolic N-H.

**4. Rhodium(III) and Iridium(III) Bipyricorrole Complexes: Syntheses, Structures and Properties**

We have successfully demonstrated the synthesis of bipyricorrole and also the coordination chemistry of monoanionic bipyricorrole with rhodium and iridium salts. The core which was effectively utilized to stabilize the metal ions in +2 oxidation states is further extended to stabilize Rh and Ir ions in +3 oxidation states. The spectral and structural analysis reveals that the complexes exhibit nonaromatic character.



**5. PtCl2 Mediated Peripheral Transformation of Carbatriphyrin(3.1.1) into *meso*-Fused *β*-*β*ʹ Dimer and Its Monomer Analogue**

An unprecedented formation of *meso*-fused β-β‘ carbaporphyrin dimer and its monomer with keto group was described. The dimer and monomer were synthesized from carbatriphyrin(3.1.1.) by metal assisted strategy using PtCl2 salt in a single step without any prefunctionalized precursors. Upon dimerization, the monomeric ligand with dianionic core is transformed into dimeric structure with unique trianionic cores



**Research work during Ph.D.**

1. **Platinum group metal complexes of picolinic hydrazine derived ligands as *in vitro* antitumor, antibacterial and imaging agents.**

C:\Users\User\Documents\Picture4.tifVarious picolinic hydrazine derived ligands were synthesized and their half-sandwich ruthenium, rhodium and iridium compounds were accomplished. Few complexes under study exhibited comparatively more bactericidal activity than amoxicillin towards *Salmonella enterica* ser*. Paratyphi.* Antitumor activityon *Dlatons Lymphoma* revelaed up to 30% apoptotic activity.

1. **Platinum group metal complexes of oxime derived ligands as *in vitro* antitumor, antibacterial and imaging agents.**

Various oxime derived lignads were synthesized and their half-sandwich water soluble ruthenium, rhodium and iridium complexes were accomplished and characterized. Few of the complexes among the tested exhibited equipotent *in vitro* antitumor activity to *cis*-platin against HT-29 (human colorectal cancer), BE (human colorectal cancer) and MIAPaCa-2 (human pancreatic cancer) cell lines. Some complexes induced apoptosis in Dalton’s ascites Lymphoma cells. Two complexes exhibited *in vivo* antitumor activity**.**



1. **Half-sandwich ruthenium, rhodium and iridium complexes of triazolopyridine ligand: Synthesis and structural studies**



Triazolopyridine ligand 3-(2-pyridyl)-[1,2,3] triazolo[1,5-a]-pyridine and benzoyl pyridine derived ligands were synthesized by reaction of *p*-toulene sulphonyl hydrazine and dipyridyl ketone and benzoyl pyridine and synthesized the respective arene ruthenium complexes.

**Analytical and technical skills:**

* Familiar in handling the instruments and characterizing compounds with the help of NMR, FT-IR, UV-Vis and emission spectrophotometer, Mass spectrometer, HPLC, GC, single crystal and powder X-ray diffraction, Cyclic Voltammetry.
* Proficient in computer softwares such as ChemBio-DrawUltra 12.0, MS Windows & Office, Origin, Endnote X7, MestReNova, Mercury, Diamond, ORTEP etc.,
* Good at documentation of the results and writing manuscripts.

**List of publications**

**Post Doctoral research**

1. Rhodium(III) and Iridium(III) Bipyricorrole Complexes: Syntheses, Structures, and Properties. B. Adinarayana, M. Murugavel, M. Das, **P.N. Rao**, A. Srinivasan ***Inorg. Chem****.* 2018, 57, 1840.
2. Siamese Twin Carbaporphyrin: A New *meso*-Fused, β-β Dimer of Carbatriphyrin[3.1.1] M. Murugavel, B. Adinarayana, Mainak Das, S. Peruncheralathan, **P.N. Rao**, and A. Srinivasan(Under review in ***Chemm. Comm****.*).
3. The first robust 3D cage-like normal and confused Calixbenzophyrins: Exploration of AIEE and cooperative cation binding propertie. **P.N. Rao**, B. Adinarayana, K.Garima, S. Chitranshi, M. Murugavel, and A. Srinivasan (In the verge of submission in ***Angew. Chem. Int. Edn****.*)
4. Organocopper(III) complex stabilized by contracted Calixcarba[1.*1*.*1*]phyrin with *adj*-CCNN core **P.N. Rao**, B. Adinarayana, M. Murugavel, and A. Srinivasan(In the verge of submission in ***Chemm. Commun.***).
5. Cryptand type three dimensional calixbenzopyrroles as selective fluoride binding agents **P.N. Rao** , B. Adinarayana, and A. Srinivasan (Manuscript under prepertion to ***Org. Lett.***).
6. Biphenyl incorporated hybrid calixpyrrole: Aggregation Induced Enhanced Emission and fluoride binding. **P.N. Rao**, B. Adinarayana, and A. Srinivasan(Manuscript under prepertion to ***Org. Lett.***).

**Doctoral Research**

1. Half sandwich ruthenium, rhodium and iridium complexes featuring oxime ligands: Structural studies and preliminary investigation of *in vitro* and *in vivo* antitumor activities. **P.N. Rao**, S. Adhikari, S.L. Shepherd, R.M. Phillips, J.R. Premkumar, A.K. Verma, W. Kaminsky, K.M. Rao.***Appl. Organomet. Chem.*** 2017, 31, 3640.
2. Antibacterial, *in vitro* antitumor and structural studies of rhodium and iridium complexes featuring the two positional isomers of pyridine carbaldehyde picolinic hydrazine ligand. **P.N. Rao**, J.R. Premkumar, A.K. Verma, K. Bhattacharjee, S.R. Joshi, S.Forbes, Y. Mozharivskyj, K.M. Rao, ***Arabian J. Chem.*** 2018, 11, 714.
3. Synthesis and evaluation of new salicylaldehyde-2-picolinylhydrazone Schiff base compounds of Ru(II), Rh(III) and Ir(III) as *in vitro* antitumor, antibacterial and fluorescence imaging agents. **P.N. Rao**, S.L. Nongbri, J.R. Premkumar, A.K. Verma, K. Bhattacharjee, S.R. Joshi, S. Forbes, Y. Mozharivskyj, R. Thounaojam, K. Aguan, K.M. Rao, ***J. Biol. Inorg. Chem.*** 2015, 20, 619.
4. Half sandwich ruthenium, rhodium and iridium complexes of triazolopyridine ligand: synthesis and structural studies. **P.N. Rao** and K.M. Rao ***J. Chem. Sci.*** 2017, 129, 177.
5. Synthesis and structural studies of half-sandwich Cp\* rhodium and Cp\* iridium complexes featuring mono, bi and tetradentate nitrogen and oxygen donor ligands **P.N. Rao,** W. Kaminsky, K.M. Rao ***J. Chem. Sci.*** 2017,129, 561.
6. Synthesis and structural studies of Cp\* Rh and Cp\* Ir complexes of picolinic hydrazine ligand. **P.N. Rao**, W. Kaminsky, K.M. Rao. ***Bull. Korean Chem. Soc.*** 2017, 38, 99.
7. *In vitro* biological activity studies of platinum group metal complexes containing N, N’- bis(picolinoyl)hydrazine ligand. **P.N. Rao**, J.R. Premkumar, A.K. Verma, K. Bhattacharjee, S.R. Joshi, S. Forbes, W. Kaminsky, K.M. Rao. ***Curr. Inorg. Chem.*** 2016, 6(2), 127.
8. Synthesis, structural, DFT studies and antibacterial evaluation of Cp\* rhodium and Cp\* iridium complexes using hydrazide based dipyridyl ketone ligand. A.B. Punna Rao, **P.N. Rao**, D.K. Deb, A. Uma, T. Chiranjeevi, B. Sarkar, W. Kaminsky, K.M. Rao. ***Inorg. Chim. Acta.*** 2016, 443, 126.
9. Neutral and cationic half-sandwich arene ruthenium, Cp\*Rh and Cp\*Ir oximato and oxime complexes: Synthesis, structural, DFT and biological studies. S. Adhikari, **P.N. Rao**, S.L. Shepherd, R.M. Phillips, W. Kaminsky, K.M. Rao. ***J. Organomet. Chem.*** 2016, 820, 70.
10. Precursor directed combinatorial biosynthesis of cephalosporin analogue by endolithic actinobacterium Streptomyces sp. AL51 by utilizing thiophene derivative K. Bhattacharjee, **P. N. Rao**, K. M. Rao, S. R. Joshi, ***3 Biotech.*** 2018, 8, 31.
11. Structure elucidation and in silico docking studies of a novel furopyrimidine antibiotics synthesized by endolithic bacterium Actinomadura sp. AL2 K. Bhattacharjee, Shakti Kumar **P.N. Rao**, P. K. Patra, K. M. Rao, S. R. Joshi, ***World J******Microbiol Biotechnol***. 2017, 33, 178.

**Academic References**

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| Dr. B. Syamasundar  (M.Sc. mentor)  Retd. Professor,  Acharaya Nagarjuna University,  Guntur, Andhra Pradesh- 522510  e-mail: [profbsyamsundar@yahoo.co.in](mailto:profbsyamsundar@yahoo.co.in)  Ph. no. 9440251372 | Prof. Kollipara Mohan Rao  (Ph.D. mentor)  Department of Chemistry,  North Eastern Hill University,  Shillong-793022,  e-mail: [mohanrao59@gmail.com](mailto:mohanrao59@gmail.com)  Ph. no. 9436166937 | Prof. A. Srinivasan,  (Post-Doc mentor)  School of chemical sciences  National Institute of Science Education and Research (NISER), Bhubaneswar-752050,  e-mail: [srini@niser.ac.in](mailto:srini@niser.ac.in)  Ph. no. 9668324153 |

I hereby declare that the particulars furnished above are complete and correct to the best of my knowledge

and belief.

Yours sincerely,



Dr. Narasingarao Palepu Ph.D