

**THE FIFTH  
INTERNATIONAL  
CONFERENCE  
ON NUMERICAL ALGEBRA  
AND  
SCIENTIFIC COMPUTING  
(NASC 2014)**

(<http://lsec.cc.ac.cn/~NASCNAG/>)

**Department of Mathematics  
Tongji University  
Shanghai, P.R. China  
October 25–29, 2014**

NASC is an international conference organized by the *Chinese numerical algebra group (CNAG)*, and run by *Academy of Mathematics and Systems Science (AMSS)*, *Chinese Academy of Sciences (CAS)*, starting from 2006. The conference highlights recent advances in theoretical, computational and practical aspects of linear and nonlinear numerical algebra. The aim of the conference is to gather numerical algebra and scientific computing experts to exchange ideas and discuss future developments and trends of these closely related fields.

The topics of NASC 2014 include, but are not limited to: solutions of linear and nonlinear equations; least-squares problems; computations of eigenvalue problems; tensor decompositions and computations; parallel computations; constructions and analyses of preconditioners; methods and theories of structured matrices; and applications of numerical algebraic techniques and algorithms.

An important event during the conference is the award of the *Applied Numerical Algebra (ANA) Prize* which is awarded to the two best papers by young Chinese scientists working on numerical algebra and scientific computing.

## **SPONSORSHIP:**

**Academy of Mathematics and Systems Science, CAS**

**Chinese Academy of Sciences**

**National Natural Science Foundation of China**

**Tongji University**

# PROGRAM

## OCTOBER 24 (FRIDAY) REGISTRATION and RECEPTION

### 15:00-17:30 REGISTRATION

Place: In the Hall of the Participant's Living Hotel

- Kingswell Hotel Tongji  
No. 50, Zhangwu Road  
Yangpu District, Shanghai  
Tel.: +86-21-51801133
  
- Jinjiang Magnolia Hotel  
No. 1251, Siping Road  
Yangpu District, Shanghai  
Tel: +86-21-65986888

### 18:00- RECEPTION DINNER

Place: In the Participant's Living Hotel

- Kingswell Hotel Tongji  
The Sunshine Coffee Bar, The First Floor
  
- Jinjiang Magnolia Hotel  
Kunlun Hall, The Fifteenth Floor

**LECTURE VENUES:**

**October 25–26:**           **The Lecture Hall**  
**The First Floor**  
**Architectural Design Academy (ADA)**  
**Tongji University**  
**Address:**               **No. 1230, Siping Road**  
**Yangpu District, Shanghai**  
**Phone:**                 **+86-21-65987788**

**October 27–28:**           **The Lecture Hall**  
**The Third Floor**  
**Kingswell Hotel Tongji**  
**Address:**               **No. 50, Zhangwu Road**  
**Yangpu District, Shanghai**  
**Phone:**                 **+86-21-51801133**

## OCTOBER 25 (SATURDAY)

### OPENING CEREMONY AND LECTURES

- 9:00-9:20 OPENING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 9:20-9:40 GROUP PHOTO
- 9:40-11:10 INVITED TALKS Chairperson: **Zhong-Ci Shi**
- 9:40-10:25 **I.C.F. Ipsen**: An Introduction to Randomized Matrix Algorithms
- 10:25-11:10 **L. Reichel**: Rational Krylov Methods for the Approximation of Matrix Function
- 11:10-11:20 TEA BREAK
- 11:20-12:10 ANA PRIZE SESSION Chairperson: **Hua Dai**
- 11:20-11:45 **Candidate A: Y. Cao**: A Splitting Preconditioner for Saddle-Point Problems
- 11:45-12:10 **Candidate B: C.-L. Liu**: Complex Nonsymmetric Algebraic Riccati Equations Arising in Markov Modulated Fluid Flows
- 12:20-14:00 LUNCH (The First Floor, Restaurant of ADA)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Ken Hayami**
- 14:30-15:00 **M. Rozloznik**: Numerical Behavior of Orthogonalization with Respect to Indefinite Bilinear Forms
- 15:00-15:30 **G.V. Muratova**: Multigrid for the Navier-Stokes Equations with Special Approximation in the Finite Element Method
- 15:30-16:00 **Z.-Z. Bai**: Two-Step Approximation Preconditioning Methods for Steady Incompressible Navier-Stokes Equations
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Bo Yu**
- 16:20-16:50 **W.-W. Lin**: On Spectral Analysis and a Novel Algorithm for Transmission Eigenvalue Problems
- 16:50-17:20 **K. Jbilou**: Matrix-Extrapolation Methods for Linear Matrix Ill-Posed Problems
- 17:20-17:50 **G.W. Howell**: LU Preconditioning for Overdetermined Sparse Least Squares Problems
- 18:00-20:00 DINNER  
**Place:** Jinjiang Magnolia Hotel  
Kunlun Hall, The Fifteenth Floor  
**Add:** No. 1251, Siping Road, Yangpu District, Shanghai
- 20:30- **SELECTION of APPL. NUMER. ALGEBRA PRIZE**  
**Place:** Kingswell Hotel Tongji  
The Executive Meeting Room, The Eleventh Floor  
**Panel Chairs:** I.C.F. Ipsen, L. Reichel, Z.-C. Shi

## OCTOBER 26 (SUNDAY)

### LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Axel Ruhe**
- 9:00-9:45 **C. Greif**: Preconditioners for Block-Structured Indefinite Linear Systems
- 9:45-10:30 **M.J. Gander**: Riemann, Schwarz, Schur, Picard: From a Gap in a Proof to Modern Domain Decomposition Methods
- 10:30-10:40 TEA BREAK
- 10:40-12:10 INVITED TALKS Chairperson: **Galina V. Muratova**
- 10:40-11:25 **A. Ramage**: IFISS: A Computational Laboratory for Investigating Incompressible Flow Problems
- 11:25-12:10 **G. Meurant**: On the Convergence of QOR and QMR Krylov Methods for Solving Linear Systems
- 12:20-14:00 LUNCH (The First Floor, Restaurant of ADA)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Wen-Wei Lin**
- 14:30-15:00 **A. Ruhe**: The Two-Sided Arnoldi Algorithm to Get Left and Right Eigenvectors of a Nonsymmetric Matrix
- 15:00-15:30 **M.G. Neytcheva**: Performance Study of Block Preconditioned Inner-Outer Solvers on Multicore CPU and GPU
- 15:30-16:00 **M. Tuma**: Preconditioned Iterative Methods for Solving Linear Least Squares
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Jian-Yu Pan**
- 16:20-16:50 **Z.-R. Ren**: An Alternating Positive Semidefinite Splitting Preconditioner for Saddle-Point Problems from Time-Harmonic Eddy Current Models
- 16:50-17:20 **X.-P. Guo**: Convergence of Modified Landweber Iteration
- 17:20-17:50 **G. Wu**: Inexact and Incremental Bilinear Lanczos Components Algorithms for High Dimensionality Reduction and Image Reconstruction
- 18:30-20:00 BANQUET of NASC 2014 (Including Issue of the Prize)  
**Place**: WH MING Hotel  
**Add**: No. 777, Jiamusi Road, Yangpu District, Shanghai  
**Tel**: +86-21-25258888

## OCTOBER 26 (SUNDAY)

### POSTER SESSION

9:00-17:50 POSTER SESSION

**Z. Chao:** Optimal Parameters of Some Iterative Methods for Augmented Systems

**Z.-Z. Liang:** Variants of the Accelerated Parameterized Inexact Uzawa Method for Saddle-Point Problems

**G.-Y. Meng:** A Practical Asymptotical Optimal SOR Method

**P. Njue:** Accelerated Successive Overrelaxation-Like Method for Augmented Systems

**N. Zheng:** Modulus-Type Inner-Outer Iteration Methods for Non-negative Constrained Least Squares Problems

## OCTOBER 27 (MONDAY)

### LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Maya G. Neytcheva**
- 9:00-9:45 **K. Vuik:** Fast and Robust Preconditioners for the Incompressible Navier-Stokes Equations
- 9:45-10:30 **W. Zulehner:** Nonstandard Sobolev Spaces and Preconditioning of Mixed Methods
- 10:30-10:40 TEA BREAK
- 10:40-12:10 INVITED TALKS Chairperson: **Miro Rozloznic**
- 10:40-11:25 **Z.-Q. Wang:** Accelerated PMHSS Iteration Methods for a Class of Block Two-by-Two Linear Systems
- 11:25-12:10 **Z.-J. Bai:** Several Optimization Approaches for Inverse Eigenvalue Problems
- 12:20-14:00 LUNCH (Tongji Guest House)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Jun-Feng Yin**
- 14:30-15:00 **H. Sadok:** Vector Extrapolation and Applications
- 15:00-15:30 **B. Dong:** Direct Polyhedral Homotopy Methods for Solving Mixed Trigonometric Polynomial Systems
- 15:30-16:00 **C.-S. Wang:** On Implementation of Nonlinear Kalman Filtering Based on Using Synchronization
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Khalid Jbilou**
- 16:20-16:50 **H.-B. An:** Parallel Solution for Multi-Group Radiation Transfer Equations
- 16:50-17:20 **X. He:** Fully Implicit Numerical Scheme for Cahn-Hilliard-Navier-Stokes Equations
- 17:20-17:50 **L.-H. Zhang:** Backward Perturbation and Residual-Based Error Bounds for the Linear Response Eigenvalue Problem
- 18:00-20:00 DINNER  
**Place:** Tongji Guest House  
**Add:** No. 69, Zhangwu Road, Yangpu District, Shanghai  
**Tel:** +86-21-31001360



## OCTOBER 27 (MONDAY)

### POSTER SESSION

9:00-17:50 POSTER SESSION

**Y.-F. Ke:** A Preconditioned Nested Splitting Conjugate Gradient Iterative Method for the Large Sparse Generalized Sylvester Equation

**H. Xiang:** Communication-Avoiding Matrix Algorithms Using Tournament Pivoting

**L.-L. Zhang:** Two-Stage Multisplitting Iteration Methods Using Modulus-Based Matrix Splitting as Inner Iteration for Linear Complementarity Problems

**X. Zhang:** Algorithms for Finding the Roots of Some Quadratic Octonion Equations

**D.-M. Zhu:** On High-Order Bivariate Markov Chains: Algorithms and Applications

## OCTOBER 28 (TUESDAY)

### LECTURES

- 9:00-10:30 CONTRIBUTED TALKS Chairperson: **Er-Xiong Jiang**
- 9:00-9:30 **M. Baboulin**: Using Condition Numbers to Assess Numerical Quality in Least Squares HPC Applications
- 9:30-10:00 **A. Salam**: Error Analysis of Modified Symplectic Gram-Schmidt
- 10:00-10:30 **J.-J. Zhang**: Linearized Augmented Lagrangian Method for Nonnegative Sparse Solution of Underdetermined Linear Equations
- 10:30-10:40 TEA BREAK
- 10:40-12:10 CONTRIBUTED TALKS Chairperson: **Hassane Sadok**
- 10:40-11:10 **Q. Niu**: A Relaxed Dimensional Factorization Preconditioner for the Incompressible Navier-Stokes Equations
- 11:10-11:40 **N.-M. Zhang**: Learning Algorithm with Momentum and Its Applications
- 11:40-12:10 **K. Morikuni**: Inner-Iteration Preconditioning or CG and MINRES-Type Methods
- 12:20-14:00 LUNCH (Tongji Guest House)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Miroslav Tuma**
- 14:30-15:00 **C.-L. Li**: Modulus-Based Matrix Splitting Iteration Methods for a Class of Nonlinear Complementarity Problems
- 15:00-15:30 **Z.-G. Jia**: Structured Methods for Image Deblurring
- 15:30-16:00 **L. Wang**: A Class of Preconditioned Iterative Methods for the Optimal Control of the Stokes Equations
- 16:00-16:20 CLOSING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 16:30-17:50 ROUND TABLE DISCUSSION IN CHINESE
- 18:00-20:00 DINNER  
**Place:** Tongji Guest House

**OCTOBER 29 (WEDNESDAY)**

**EXCURSION**

9:00-16:30            EXCURSION    (To Tongli Ancient Town)  
9:00    (**EXACT**)    Buses start from the gates of both  
                         Kingswell Hotel Tongji and Jinjiang Magnolia Hotel  
18:00-20:00            DINNER  
                         **Place:** Tongji Guest House

## **BRIEF HISTORY OF NASC:**

**NASC 2006:** AMSS, Beijing, October 22–25

**Co-Chairs:** Raymond H. Chan and Zhong-Ci Shi

**Special Issue:** Journal of Computational and Applied Mathematics, 226:1(2009)

**Special Issue Editors:** Zhong-Zhi Bai, Lothar Reichel and Zhong-Ci Shi

**NASC 2008:** Nanjing Normal University, Nanjing, November 2-5

**Co-Chairs:** Iain S. Duff and Zhong-Ci Shi

**Special Issue:** Linear Algebra and Its Applications, 434:11(2011)

**Special Issue Editors:** Zhong-Zhi Bai, Michele Benzi, Iain S. Duff, Andreas Frommer and Zhong-Ci Shi

**NASC 2010:** AMSS, Beijing, October 23–27

**Co-Chairs:** Martin H. Gutknecht and Zhong-Ci Shi

**Special Issue:** Numerical Linear Algebra with Applications, 19:6(2012)

**Special Issue Editors:** Zhong-Zhi Bai, Iain S. Duff, Lothar Reichel and Zhong-Ci Shi

**NASC 2012:** Dalian University of Technology, Dalian, October 20–24

**Co-Chairs:** Lev A. Krukier and Zhong-Ci Shi

**Special Issue:** Journal of Engineering Mathematics, 89:1(2014)

**Special Issue Editors:** Zhong-Zhi Bai and Iain S. Duff

**NASC 2014:** Tongji University, Shanghai, October 25–29

**Special Issue:** BIT Numerical Mathematics, vol:no(2016)

**Special Issue Editors:** Zhong-Zhi Bai and Lothar Reichel

## **BRIEF HISTORY OF ANA PRIZE WINNERS:**

**NASC 2006:** Heng-Bin An

**NASC 2008:** Zheng-Jian Bai

**NASC 2010:** Jun-Feng Yin

**NASC 2012:** Bo Dong and Lei-Hong Zhang

## **BRIEF HISTORY OF ANA PRIZE COMMITTEE:**

**NASC 2006**

**Advisory Board:** Iain S. Duff   Gene H. Golub   Zhong-Ci Shi

**Members:**

Feng-Shan Bai	Zhao-Jun Bai	Hua Dai	Iain S. Duff
Gene H. Golub	Martin H. Gutknecht	Ken Hayami	Lev A. Krukier
Tian-Gang Lei	Xing-Ping Liu	Wen Li	Lin-Zhang Lu
Shu-Fang Xu	Zhong-Ci Shi	Yang-Feng Su	

### **NASC 2008**

**Advisory Board:** Iain S. Duff    Zhong-Ci Shi    Andrew J. Wathen

**Members:**

Zhong-Zhi Bai	Iain S. Duff	Ken Hayami	Volker Mehrmann
Zhong-Ci Shi	Yong-Zhong Song	Andrew J. Wathen	

### **NASC 2010**

**Advisory Board:** Iain S. Duff    Martin H. Gutknecht    Zhong-Ci Shi

**Members:**

Raymond H. Chan	Iain S. Duff	Martin H. Gutknecht	Er-Xiong Jiang
Lev A. Krukier	Lothar Reichel	Zhong-Ci Shi	Yong-Zhong Song
Andrew J. Wathen			

### **NASC 2012**

**Advisory Board:** Iain S. Duff    Lev A. Krukier    Zhong-Ci Shi

**Members:**

Hua Dai	Iain S. Duff	Ken Hayami	Lev A. Krukier
Maya G. Neytcheva	Lothar Reichel	Zhong-Ci Shi	

### **NASC 2014**

**Advisory Board:** Ilse C.F. Ipsen    Lothar Reichel    Zhong-Ci Shi

**Members:**

Zhong-Zhi Bai	Hua Dai	Ken Hayami	Ilse C.F. Ipsen
Galina V. Muratova	Maya G. Neytcheva	Alison Ramage	Lothar Reichel
Miro Rozloznik	Zhong-Ci Shi	Kees Vuik	