

ATC

Advanced Technologies Committee

(2023-2024)

- Overview ATC activities (Bert van Duijn)
- Consortium for sharing image data for the development of Imaging Technologies for seed quality testing (Ganesh Kumar, Craig McGill, Bert van Duijn)

16 Members from 13 Countries



- Bert van Duijn (NL), chair
- Francisco G. Gomes Junior (BR), vice chair
- Brigitte Hamman (SA)
- Devaraja Achar A.M. (IN)
- Birte Boelt (DK)
- Sebastian Bopper (GER)
- Kent J. Bradford (USA)
- Henry Bruggink (NL)
- Aurélie Charrier (FR)
- Giovanny Lopez (NL)
- Mailén Ariela Martinez (AR)
- Nikolay S. Priyatkin (RU)
- Tomoko Sakata (JP)
- Zhujun Zhu (CN)
- Sunmeet Bhatia (NZ)
- Ganesh Kumar (USA)

Ecom liason: Craig McGill



Current working groups

- X-ray based technologies
 - 2D X-ray
 - 3D X-ray
- (Multi spectral) Imaging
- (Mathematical) Modelling in seed testing (with STA & MOI)
- Molecular Technologies
- Exploring central depository for images of Physical Purity (with STA, Ecom members)
- Practical guidelines for image analysis (with PUR, STA, GER, VIG)
- Workshops/ seminars

ATC involvement in 2 ISTA funded special projects

Assessment on available technologies of imaging and image analysis for other seeds determination (OSD), purity analysis and germination.

(Collaboration between PUR, ATC and GER), **Finalized 2023**

Exploration of methods for detecting insects in seed lots.

(Collaboration between SHC and ATC), **Finalized 2023**

Seminar/interest meeting on Mathematical modelling in seed testing (May 31, 2023, Verona)



Mathematical Modelling Seminar

- Introduction to the initiative and types of modelling to consider
Bert van Duijn, ATC / Tomoko Sakata, ATC
- The Ellis-Roberts viability equations to model seed longevity in storage and extension into germination time courses via the PBT models
Fiona Hay, MOI / Kent Bradford, ATC
- A.I. Based Modelling in Seed Imaging Applications
Kyle T. Peterson (Bayer Crop Sciences, Innovation Science & Engineering, USA)
- Discussion on Assessing Uncertainty in Seed Testing Models & Statistics
Committee Activities
Jean-Louis Laffont, STA / Kirk Remund, STA
- Wrap up and discussion.



Lectures (selection)

- ISTA Annual Meeting 2023, Verona
 - Report lecture/discussion: Insect detection in seed (Aurélie Charrier, ATC)
- Joint FAO/ISTA Webinar: New Technologies in Seed Testing October 4, 2023
 - Emerging trends and future outlook of modern technologies in seed quality testing (Bert van Duijn, ATC)
 - Seed moisture testing (Kent Bradford. ATC)
 - Adoption of modern seed testing technologies across the world and how to address the capacity needs and gaps in different countries. (Aurélie Charrier, ATC)
- DanSeed Symposium 2023, Kobæk Strand Konferencenter, Denmark. March 6-7 2023.
 - ISTA technical projects – purity by number and insects. (Birte Boelt, ATC)
- The fifth international conference with tutorial day "Physics for Life Sciences" November, 2023
 - Electrophotography is a promising method for seed quality assessment. (Nikolay Priyatkin, ATC)
- ISSS-ISTA webinar for 'Seed priming' November 29, 2023
 - Seed priming: practical commercial use and its evaluation. (Tomoko Sakata, ATC)

Publications (selection 2023)



Advanced Technologies Committee (report) ISTA's First Scientific Writing Workshop 1 November 2022, Athens.	Bert van Duijn (Chair) and Francisco G. Gomes Jr (Vice-Chair) Sunmeet Bathia, Kalomoira Delga, Sebastian Bopper and Marie-Hélène Wagner (ATC and VIG)	Seed Testing International No. 166, October 2023 pp. 34-35 Seed Testing International No. 165, April 2023 pp. 51.
Concluding paper on Exploration of Methods for Detecting Insects in Seed Lots. Summary and Recommendations from ISTA Special Project 19-1: Application of Marketplace Available Technologies of Computer Vision in Seed Testing Chapter X-ray imaging in "Handbook of Tree and Shrub seed testing"	SHC, ISTA Special project 20-1: Exploration of Methods for Detecting Insects in Seed Lots. Ruoqing Wang, Liang Zhao, Bert van Duijn (PUR and ATC) Tree and Shrub Seed Committee	Seed Testing International Seed Testing International No. 165, April 2023 pp. 21-24.
Valorization of sorghum ash with digestate and biopreparations in the development biomass of plants in a closed production system of energy	Z. Romanowska-Duda, Regina Janas, Mieczyslaw Grzesik (ATC) Bert van Duijn (ATC)	October 2023 Scientific Reports 13(1) DOI: 10.1038/s41598-023-45733-9
A chemometric method for the viability analysis of spinach seeds by near infrared spectroscopy with variable selection using successive projections algorithm	Madan Kumar Lakshmanan, Birte Boelt (ATC) and Rene Gislum	Journal of Near Infrared Spectroscopy 2023, Vol. 31(1) 24–32. DOI: 10.1177/09670335221138955
Application of gas discharge visualisation technique for seeds hidden defects evaluation.	PRIYATKIN N.S. (ATC) et al.	Theoretical and Applied Ecology. - 2023. No.3. - P. 37–48. DOI: 10.25750/1995-4301-2023-3-037-04
Evaluation of heterogeneity and hidden defects of wheat (<i>Triticum aestivum</i> L.) seeds by instrumental physical methods.	PRIYATKIN N.S (ATC) et al.	Sel'skokhozyaistvennaya Biologiya [Agricultural Biology], 2022, Vol. 57, № 5, p. 911-920. doi: 10.15389/agrobiology.2022.5.911eng
X-ray and Micro-CT image analysis of soybean seeds in relation to the Tetrazolium Test.	Martinez, M.A. (ATC); Arango Perearnau, M.R.; Andretich, G.; Peralta, M.; Airaldo, G.; Gallo, C.	ISTA Seed Symposium Athens, Greece.
Chlorophyll retention and low oxygen consumption rates in soybean seeds produced under heat-drought stress.	Martinez, M.A (ATC)Montechiarini, N.H.; Gosparini, C.O.; Oppedijk, B.; van Duijn, B. (ATC)	XXXIV Argentinian Meeting of Plant Physiology (RAFV 2023), Rosario, Argentina.
The influence of seed moisture content on the results of the Radicle Emergence Test of rapeseed (<i>Brassica napus</i>)	Bopper, S. (ATC)), Goertz, S, Zur, J. and M. Kruse	Seeds" 134th VDLUFA Congress. Page https://www.vdlufa.de/wp-content/uploads/2023/08/Kurzfassungen.pdf



Planned Workshops and Seminars

ATC lectures Annual Meeting in Cambridge: new technologies
Wednesday July 3. 16.16 – 17.15 Debating Chamber

ATC workshop - Imaging in seed quality assurance
Hyderabad: in planning

ATC-SHC workshop – Insect detection in seeds
March 23-25, 2025. Angers, France

ATC seminar – **Advances in Seed Testing**
April 2025. Hangzhou, China

In the Annual Meeting 2024

ATC lectures Annual Meeting in Cambridge: new technologies

Wednesday July 3. 16.16 – 17.15 Debating Chamber



- **Exploring Molecular Tools for Evaluating Seed Quality**
Giovanny Lopez (ATC)
- **Developments in Multispectral Imaging and Image Analysis on seeds**
Birte Boulton (ATC)
- **An example of using Bayesian statistics: revised OSD heterogeneity testing under certain conditions**
Kirk Remund and Jean-Louis Laffont (STA)

Working group on practical guidelines for Image Analysis

Wednesday July 3. 14.45 – 15.45 Debating Chamber

- **Introduction, feed back and next steps (Ruoqing Wang, PUR / Bert van Duijn, ATC)**





Thank you

 **ISTA ANNUAL MEETING 2024**  **01-04 JULY CAMBRIDGE, UNITED KINGDOM**

