

# Mohamed RHAIMA

Assistant Professor

<https://fac.ksu.edu.sa/mrhaimac/home>

<https://scholar.google.com/citations?user=DVmn0qcAAAAJ&hl=en>

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## Personal Address

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## Professional Address

Department of Statistics & OR  
College of Sciences  
Building 4, Office 2B26  
King Saud University  
Riyadh 11451, Saudi Arabia

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## Academic Qualification

- 2012 – 2017 **Ph.D**, in Mathematics, joint supervision between the research center "Vito Volterra" at Tor Vergata University, Rome-Italy and the faculty of Sciences of Tunis at the University of Tunis El Manar, Tunis-Tunisia (diploma - April 2017).
- **Supervisors:** Luigi Accardi and Abdessatar Barhoumi.
  - **Speciality:** Quantum Probability.
  - **Title:** Classification of Probability Measures through their canonically associated Interacting Fock Spaces.
- 2010 – 2012 **Master of Applied Mathematics**, *University of Tunis El Manar*, Stochastic Analysis And its Applications (diploma - July 2012)
- **Title:** Stochastic, Finance.
- 2005 – 2007 **Bachelor of Science in Mathematics**, University of Gabes, Tunisia
- 2003 – 2005 **General Academic Studies Degree**, University of Gabes, Tunisia
- **Speciality:** Mathematics and Computer Sciences.
- July 2003 **Baccalaureate in Mathematics** , Secondary School of Ghannouche, Gabes, Tunisia.

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## Professional Experience

- 2018 – Today **Assistant Professor**, at *King Saud University College of Sciences, Building 4, Department of Statistics and operations research (OR), KSA*
- ✓ Biostatistics for the preparatory cycle of health studies.
  - ✓ Statistical Methods for the students of bachelor degree.
  - ✓ Probability and Statistics for Engineers.
  - ✓ Participation in the projects supervision.
  - ✓ Probability (2) for the students of bachelor degree.
  - ✓ Statistical Theory II for the students of bachelor degree.
- 2017 – 2018 **Assistant Professor**, at the *Higher Institute of Applied Studies in Humanities of Mahdia, University of Monastir, Tunisia*
- ✓ General Mathematics: Courses and exercises for LMF 1 and 2 students.
- 2015 – 2017 **Assistant Professor**, at the *Engineering Preparatory Institute of Nabeul, Carthage University, Tunisia*
- ✓ Real Analysis: Courses and exercises for preparatory Students.
  - ✓ Algebra: Courses and exercises for preparatory Students.
  - ✓ Probability: Courses and exercises for preparatory Students.

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## Committees

- 2018 – 2019 **Member of the Statistics Committee**, *At Department of Statistics and operations research, College of Sciences, King Saud University, KSA*
- 2019 – Today **Member of the Academic Evaluation and Accreditation Committee for Undergraduate Programs**, *At Department of Statistics and operations research, College of Sciences, King Saud University, KSA*

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## Training

- July 2018 **Research internship about quantum Markov fields in collaboration with professor Luigi Accardi**  
*At Nabeul Preparatory Engineering Institute, University of Carthage, Tunisia.*
- 2013 – 2017 **Tor Vergata University, Rome Italy: Several trips of one month to three months every year since 2013 Research internship in Quantum Probability and Orthogonal Polynomials in collaboration with prof. Luigi Accardi**  
*At Vito Volterra Interdepartmental Centre, Tor Vergata, Italy.*

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## Research Areas

- Quantum Probability
- Probability Theory
- Operator Algebras
- Orthogonal Polynomials Theory.
- Quantum Markov Chains.
- Stability of Stochastic differential equation.

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## Publications

1. Souissi Abdessatar, E. Soueidy, El Gheteb, **Mohamed Rhaima**, Lassaad Mchiri, A. Ben Makhlouf (2023): Clustering property for quantum Markov chains on the comb graph. AIMS MATHEMATICS.
2. **Mohamed Rhaima**, Lassaad Mchiri, A. Ben Makhlouf (2023):  $H_\infty$  and Asymptotic Stability via delay feedback for hybrid neutral stochastic delay differential equations with Levy noise. IMA JOURNAL OF MATHEMATICAL CONTROL AND INFORMATION.
3. **Mohamed Rhaima** (2023): Ulam–Hyers stability for an impulsive Caputo–Hadamard fractional neutral stochastic differential equations with infinite delay. MATHEMATICS AND COMPUTERS IN SIMULATION.
4. **Mohamed Rhaima** (2023): Ulam type stability for Caputo-Hadamard fractional functional stochastic differential equation with delay. Mathematical Methods in Applied Sciences.
5. Tomás Caraballo, Lassaad Mchiri, BELFEKI Mohsen, **Mohamed Rhaima** (2022): Mean square stability for controlled hybrid neutral stochastic differential equations with infinite delay. To appear on Mathematical Methods in Applied Sciences.
6. Mhamed Eddahbi, Lassaad Mchiri, **Mohamed Rhaima** (2022): Numerical solution of quadratic SDE with measurable drift. Filomat. (**ISI, impact factor 0.844 Q3**)
7. Tomás Caraballo, Lassaad Mchiri, **Mohamed Rhaima** (2022): Asymptotic stability with respect to part of the variables of neutral stochastic pantograph differential equations with Markovian switching. Advances in Difference Equations. (**ISI, impact factor 2.8 Q1**)
8. Ben Makhlouf. A, Lassaad Mchiri, **Mohamed Rhaima**, Mohamed Ali Hammami (2022): Stability of conformable stochastic systems depending on a parameter. Asian Journal of Control. (**ISI, impact factor 3.452 Q2**)

9. Tomás Caraballo, Lassaad Mchiri, **Mohamed Rhaima** (2022): Ulam-Hyers-Rassias stability of neutral stochastic functional differential equations. Stochastics. (**ISI, impact factor 0.93 Q3**)  
<https://www.tandfonline.com/doi/abs/10.1080/17442508.2022.2028788?journalCode=gssr20>
10. Ben Makhlouf. A, Lassaad Mchiri, Baleanu. D, **Mohamed Rhaima** (2021): Finite-Time Stability of Linear Stochastic Fractional Order Systems with Time Delay. Advances in Difference Equations, 2021, 345 (2021). (**ISI, impact factor 2.8 Q1**).  
<https://doi.org/10.1186/s13662-021-03500-y>
11. Tomás Caraballo, Lassaad Mchiri, Belfeki Mohsen, **Mohamed Rhaima** (2021): h-stability in p-th moment of neutral pantograph stochastic differential equations with Markovian switching driven by Levy noise, Nonlinear Analysis: Hybrid System. Chaos, Solitons & Fractals, Volume 151, October 2021, 111249. (**ISI, impact factor 5.944 Q1**).  
<https://www.sciencedirect.com/science/article/pii/S0960077921006032?dgcid=author>
12. Tomás Caraballo, Lassaad Mchiri, **Mohamed Rhaima** (2021): Partial practical exponential stability of neutral stochastic functional differential equations with Markovian switching. Mediterranean Journal of Mathematics, 18-142. (**ISI, impact factor 1.4 Q2**).  
<https://link.springer.com/article/10.1007/s00009-021-01786-6>
13. Lassaad Mchiri, **Mohamed Rhaima** (2021):  $\beta$ -Stability in  $q$ -th moment of neutral impulsive stochastic functional differential equations with Markovian switching. Mathematical Problems in Engineering, vol. 2021, Article ID 9975897, 11 pages. (**ISI, impact factor 1.3 Q4**).  
<https://www.hindawi.com/journals/mpe/2021/9975897/>
14. Abdellatif Ben Makhlouf, Lassaad Mchiri, **Mohamed Rhaima** (2021): Ulam-Hyers-Rassias Stability of stochastic functional differential equations via fixed point method. Journal of Function Spaces, vol. 2021, Article ID 5544847, 7 pages. (**ISI, impact factor 1.8 Q1**).  
<https://www.hindawi.com/journals/jfs/2021/5544847/>
15. Tomás Caraballo, Lassaad Mchiri, BELFEKI Mohsen, **Mohamed Rhaima** (2021): p-th moment exponential stability of neutral stochastic pantograph differential equations with Markovian switching. Communications in Nonlinear Science and Numerical Simulation, Volume 102, November 2021, 105916. (**ISI, impact factor 4.26 Q1**).  
<https://www.sciencedirect.com/science/article/pii/S1007570421002288?dgcid=author>
16. Luigi Accardi, Abdessatar Barhoumi, **Mohamed Rhaima** (2018): Jacobi sequences of powers of random variables. Infinite Dimensional Analysis. Quantum Probability and Related Topics. (**ISI, impact factor 0.79 Q4**).  
<https://www.worldscientific.com/doi/10.1142/S0219025718500017>
17. Luigi Accardi, Abdessatar Barhoumi, **Mohamed Rhaima** (2017): Jacobi sequences of squares of random variables. Stochastics, Volume 89, Issue 6-7. (**ISI, impact factor 0.93 Q3**).  
<https://www.tandfonline.com/doi/full/10.1080/17442508.2016.1247161>
18. Luigi Accardi, Abdessatar Barhoumi, Yun Gang Lu, **Mohamed Rhaima** (2016): \*-Lie algebras canonically associated to probability measures on  $\mathbb{R}$  with all moments. Lie Theory and its Applications in Physics, Volume 191 of the Springer Proceeding series in Mathematics and Statistics, 3–21.  
<https://www.springer.com/gp/book/9789811026355>
19. Luigi Accardi, Abdessatar Barhoumi, **Mohamed Rhaima** (2016): An information complexity index for probability measures on  $\mathbb{R}$  with all moments. Infinite Dimensional Analysis. Quantum

## Submitted Papers

1. Abdellatif Ben Makhlouf, Lassaad Mchiri, **Mohamed Rhaima** (2022):  $H_\infty$  and Asymptotic Stability via delay feedback for hybrid neutral stochastic functional differential equations with Lévy noise. Journal of Mathematical Control and Information.
2. **Mohamed Rhaima** (2022): Existence and Ulam-Hyers stability for an impulsive Caputo-Hadamard fractional neutral functional stochastic differential equation with infinite delay of order  $\frac{1}{2} < \lambda < 1$ .
3. Abdessatar Souissi, **Mohamed Rhaima** (2022): Quantum Markov Chains Associated with Open Quantum Random Walks on the Comb graph.
4. Lassaad Mchiri, **Mohamed Rhaima** (2021): Practical  $\mu$ -Stability in  $p$ -th moment of Stochastic Functional Differential Equations with Infinite Delay (Submitted).
5. Abdessatar Souissi, El Gheteb Soueidy, **Mohamed Rhaima** (2021): Generalized Kronecker product for matrices over  $C^*$ -algebras, Linear Algebra and its Applications (Submitted).
6. Abdessatar Souissi, Soueidy El Gheteb and **Mohamed Rhaima** (2021): Clustering Property for Quantum Markov Chains on the Comb Graph, Open Systems & Information Dynamics (Submitted).

## Manuscripts In Progress

1. Mohamed Rhaima: On associated Jacobi sequences of Third power of random variables.
2. Mohamed Rhaima: Probability class of index  $(0, 0)$ .

## International Conferences

1. Online Participation at the Quantum Probability Conference QP-42, January 17-20, 2022, India.
2. Talk on the workshop on Orthogonal polynomials and Operators Theory, December 18-21, 2017 Sousse, Tunisia.
3. Participation at the School on Spectral Theory of Graphs and Varieties, November 7-19, 2016 Kairouan, Tunisia.
4. Talk at the School and Workshop on "Orthogonal polynomials, Interacting Fock Spaces, Quantum Markov Semigroups and related fields", October 17-21, 2016, Hammamet, Tunisia.
5. Talk on the Conference of the Tunisian Mathematical Society, March 21-24, 2016 Hammamet, Tunisia.
6. Participation at the Conference of the Tunisian Mathematical Society, March 16-19, 2015 Sousse, Tunisia.
7. Participation at the International conference on Stochastic Analysis and Application, October 10-15, 2011 Hammamet, Tunisia.

## Languages

- **Arabic:** native speaker
- **English:** good written and spoken

- **French:** good written and spoken

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## Computer Skills

- **OS:** *Windows, DOS*
- **Scientific:** *Matlab, Maple, R, Python*
- **Typography:** *L<sup>A</sup>T<sub>E</sub>X, Microsoft Office*