# Dr. Jozsef Kupai, PhD

**Associate Professor in Chemical Engineering**
Head of the Organocatalysis Subgroup
(Supramolecular Chemistry Research Group)
Department of Organic Chemistry and Technology
Budapest University of Technology and Economics

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## Positions:

*2021–*
Associate Professor in Chemical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary

*2016–2020*
Assistant Professor in Chemical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary

*2012 –2016*
Postdoctoral Research Fellow
Budapest University of Technology and Economics, Budapest, Hungary

## Education:

*2007 – 2012*
PhD in Chemistry with *summa cum laude* grade awarded 20/09/2012
Budapest University of Technology and Economics, Budapest, Hungary
Supervisor: Prof. Péter Huszthy
Title: Synthesis and application of chiral 18-crown-6 ethers containing a pyridine subunit

*2002– 2007*
MSc and BSc in Chemical Engineering, Pharmaceutical specialization
Budapest University of Technology and Economics, Budapest, Hungary
Faculty of Chemical and Bioengineering, Branch of Industrial Pharmaceutics

## Experience:

Nanofiltration & Molecular Imprinting Laboratory, School of Chemical Engineering & Analytical Science, **The University of Manchester**, United Kingdom, Juny and July 2016 (5 weeks), visiting academic. Supervisor: Dr. Gyorgy Szekely
Synthetic organic chemistry, Schlenk technique, MW reactions, HPLC, NMR, preparation of nanofiltration membranes

**EGIS Plc.** Internship, July 2006 (4 weeks)
Chemistry II., Synthetic organic laboratory, Supervisor: Dr. Matyas Milen
Synthetic organic chemistry

**Supervisor activity:**

*2007–2020:*

**Supervisor of PhD theses (2):**

Kisszékelyi Péter (2020), Nagy Sándor (2020).

**Supervisor of MSc theses (7):**

Bezzegh Dóra (2015), Maszler Péter (2015), Rojik Eszter (2015), Szabó Luca (2015), Kozma Petra (2019), Fehér Zsuzsanna (2019), Dargó Gyula (2020).

**Supervisor of BSc theses (15):**

Bezzegh Dóra (2013), Maszler Péter (2013), Rojik Eszter (2013), Szabó Luca (2013), Cseri Levente (2016), Ignácz Gergő (2016), Kozma Petra (2017), Fehér Zsuzsanna (2017), Dargó Gyula (2018), Tóth Blanka (2018), Vu Hai Dang (2019), Zeller Bálint (2019), Funda Lidya Görür (2020), Diana Daicu (2020), Richter Dóra (2020).

*2021–:*

**Supervisor of postdoctoral researcher (1)**

Nagy Sándor

**Supervisor of PhD students (2)**

Fehér Zsuzsanna, Dargó Gyula.

**Supervisor of MSc students (1)**

Richter Dóra

**Supervisor of BSc students (7)**

Erdélyi Dóra, Hana Mallek, Kis Dávid, Kiss Johanna, Molnár Balázs, Németh Réka, Pósa Szonja.

**Teaching:**

- Organic chemistry I and II. (English lecture and practical)
- Introductory organic chemistry for MSc students (Hungarian lecture)
- Introductory Mathematics (Hungarian practical)
- Organic Chemistry Practical I. and II. (Hungarian practical)
- Synthetic Organic Chemistry Laboratory (Hungarian)
- Chemistry of Biomolecules Laboratory (Hungarian)

**Grants:**

**I.** Hungarian Scientific Research Fund (**OTKA-K81127**, **OTKA-K112289**, **OTKA-K128473**)
Group for Supramolecular Chemistry, Péter Huszthy Dr., Budapest, Hungary
*Investigator, September 2006–*

- *2006–2012*: Synthesis of chiral 18-crown-6 ethers containing a pyridine subunit and their application for enantioseparation of protonated primary amines and amino acid derivatives
- *2012–:* Synthesis, application, and recovery of organocatalysts containing heterocycles

**II.** Hungarian Scientific Research Fund (**OTKA-PD108462**)
**Qualification result: Excellent (10/10)**
***Principal investigator**, September 2013– September 2017*

- Synthesis and application of new thiourea, amide and sulfonamide type organocatalysts containing heterocycle subunits

**III.** Hungarian Scientific Research Fund (**OTKA-FK138037**)
***Principal investigator**, September 2021– September 2025*

- Synthesis and sustainable applications of metal-free asymmetric catalysts

## Awards:

- *Scholarship of the Hungarian Republic*, Faculty of Chemical and Bioengineering, Budapest University of Technology and Economics, Budapest, Hungary, 2007; achievement: outstanding records in studies
- *Meisel Tibor Prize*, Faculty of Chemical and Bioengineering, Budapest University of Technology and Economics, Budapest, Hungary, 2007; achievement: outstanding records in studies
- *Doszlop Sándor Prize*, Faculty of Chemical and Bioengineering, Budapest University of Technology and Economics, Budapest, Hungary, 2011; achievement: outstanding records in studies and for community activities
- *Kajtár Márton Prize*, Kajtár Márton Foundation, Budapest, Hungary, 2013; achievement: outstanding records in research
- *Excellent Lecturer of BME*, Student Council of University, Budapest, Hungary, 2016; achievement: excellent skills in teaching
- *Bolyai János Research Scholarship*, Hungarian Academy of Sciences, Budapest, Hungary, 2018; achievement: outstanding records in research
- *Scholarship of the New National Excellence Program of the Ministry of Human Capacities (ÚNKP-18-4)*, 2018, achievement: outstanding records in research
- *Kisfaludy Lajos Prize*, Kisfaludy Lajos Foundation, Budapest, Hungary, 2019; achievement: best publication in Hungary among young chemists
- *Excellent Lecturer of BME*, Student Council of University, Budapest, Hungary, 2019; achievement: excellent skills in teaching
- *Scholarship of the New National Excellence Program of the Ministry of Human Capacities (ÚNKP-19-4)*, 2019, achievement: outstanding records in research
- *Győző Bruckner Prize*, Hungarian Academy of Sciences, outstanding records in research
- *Scholarship of the New National Excellence Program of the Ministry of Human Capacities (ÚNKP-20-4)*, 2020, achievement: outstanding records in research

## Editorial activities:

- Guest Editor of a Special Issue entitled *'Advances in Organocatalysts: Synthesis and Applications*' at the MDPI journal Materials
- Review Editor of the Separation Processes section of the journal *Frontiers in Chemical Engineering*.

**Publications:**

Peer-reviewed international articles: **34**
First author: **7**
Corresponding author: **13**
Review articles: **3**
Independent citations: **378**
*Hirsch* index: **13**
Overall impact factor: **101.195**

Presentations at conferences: more than 20
Invited presentations at conferences: 6

**The 10 main publications (2015–2020):**

1. **Kupai J.**; Rojik E.; Huszthy P.; Székely G.:Role of Chirality and Macroring in Imprinted Polymers with Enantiodiscriminative Power, *ACS Appl Mater Interfaces* **2015**, *7*, 9516–9525. *Independent citations: 49.* ***IF: 7.145***
2. **Kupai, J.**; Razali, M.; Buyuktiryaki, S.; Kecili, R.; Szekely, G.: Long-term stability and resuability of molecularly imprinted polymers, *Polym. Chem.* **2017**, *8*, 666–673. *Independent citations: 84.* ***IF: 5.687***
3. Fődi, T.; Didaskalou, C.; **Kupai, J.**; Balogh, G. T.; Huszthy, P.; Szekely, G.: Nanofiltration-Enabled In Situ Solvent and Reagent Recycle for Sustainable Continuous-Flow Synthesis, *ChemSusChem* **2017**, *10*, 3435–3444. *Independent citations: 60.* ***IF: 7.226***
4. Nagy, S.; Fehér, Z.; Kisszékelyi, P.; Huszthy, P.; **Kupai, J.***: Cinchona derivatives as sustainable and recyclable homogeneous organocatalysts for aza-*Markovnikov* addition, *New J. Chem.* **2018**, *42*, 8596–8602. **: corresponding author, Independent citations: 1.* ***IF: 3.069***
5. Didaskalou, C.; **Kupai, J.*;** Cseri, L.; Barabas, J.; Vass, E.; Holtzl, T.; Szekely, G.: Membrane-grafted asymmetric organocatalyst for an integrated synthesis-separation platform, *ACS Catal.* **2018**, *8*, 7430–7438.**: co-first author; Independent citations: 60.* ***IF: 12.221***
6. Fődi, T.; Ignácz, G.; Decsi, B.; Béni, Z.; Túrós, G. I.; **Kupai, J.**; Balogh-Weiser, D.; Greiner, I.; Huszthy, P.; Balogh, G. T.: Biomimetic synthesis of drug metabolites in batch and continuous-flow reactors, *Chem. Eur. J.* **2018**, *24*, 9385–9392. *Independent citations: 3.* ***IF: 5.16***
7. Nagy, S.; Dargó, G.; Kisszekelyi, P.; Fehér, Z.; Simon, A.; Barabás, J.; Höltzl, T.; Mátravölgyi, B.; Karpati, L.; Drahos, L.; Huszthy, P.; **Kupai, J.***: New enantiopure binaphthyl-cinchona thiosquaramides: synthesis and application for enantioselective organocatalysis, *New J. Chem.* **2019**, *43*, 5948–5959. **: corresponding author, Independent citations: 7.* ***IF: 3.069***
8. Kisszekelyi, P.; Alammar, A.; **Kupai, J.***; Huszthy, P.; Barabas, J.; Holtzl, T.; Szente, L.; Bawn, C.; Adams, R.; Szekely, G.: Asymmetric synthesis with cinchona-decorated cyclodextrin in a continuous-flow membrane reactor, *J. Catal.* **2019**, *371*, 255–261. **: co-corresponding author. Independent citations: 22.* ***IF: 7.723***
9. Kisszekelyi, P.; Hardian, R.; Vovusha, H.; Chen, B.; Zeng, X.; Schwingenschlogl, U.; **Kupai, J.***; Szekely G.: Selective Electrocatalytic Oxidation of Biomass-derived 5-Hydroxymethylfurfural to 2,5-Diformylfuran: From Mechanistic Investigations to

Catalyst Recovery, *ChemSusChem* **2020**, *13*, 3127–3136. **: co-corresponding author, Independent citations: 13.* ***IF: 8.928***

10. Nagy, S.; Fehér, Z.; Kárpáti, L.; Bagi, P.; Kisszékelyi, P.; Koczka, B.; Huszthy, P.; Pukánszky, B.**; Kupai, J.***: Synthesis and applications of cinchona squaramide-modified poly(glycidyl methacrylate) microspheres as recyclable polymer-grafted enantioselective organocatalysts, *Chem. Eur. J.* **2020**, *26*, 13513–13522. **: corresponding author, Independent citations: 1.* ***IF: 5.236***

**Publications (2008–2019):**

1. Tóth, T.; Huszthy, P.; **Kupai, J.**; Nyitrai, J.: Synthesis of new enantiopure dimethyl-substituted pyridino-18-crown-6 ether type macrocycles containing different substituents at position 4 of the pyridine ring for enantiomeric recognition studies, *Arkivoc* **2008**, *iii*, 66–79.
2. Ilisz, I.; Iványi, R.; Pataj, Z.; **Kupai, J.**; Huszthy, P.; Szatmári, I.; Fülöp, F.; Péter, A.: CE Enantioseparation of Betti Bases with Cyclodextrins and Crown Ether as Chiral Selectors, *Chromatographia* **2010**, *71*, S115–S119.
3. **Kupai, J.**; Huszthy, P.; Székely, K.; Tóth, T.; Párkányi, L.: Synthesis of new enantiopure dimethyl- and diisobutyl-substituted pyridino-18-crown-6 ethers containing a halogen atom or a methoxy group at position 4 of the pyridine ring for enantiomeric recognition studies, *Arkivoc* **2011**, *ix*, 77–93.
4. **Kupai, J.**; Huszthy, P.; Katz, M.; Tóth, T.: Synthesis of new enantiopure dimethyl-substituted pyridino-18-crown-6 ethers containing a hydroxymethyl, a formyl, or a carboxyl group at position 4 of the pyridine ring for enantiomeric recognition studies, *Arkivoc* **2012**, *v*, 134–145.
5. **Kupai, J.**; Lévai, S.; Antal, K.; Balogh, G. T.; Tóth, T.; Huszthy, P.: Preparation of pyridino-crown ether–based new chiral stationary phases and preliminary studies on their enantiomer separating ability for chiral protonated primary aralkylamines, *Tetrahedron:Asymmetry* **2012**, *23*, 415–427.
6. Székely, G.; Csordás, B.; Farkas, V.; **Kupai, J.**; Pogány, P.; Sánta, Z.; Szakács, Z.; Tóth, T.; Hollósi, M.; Nyitrai, J.; Huszthy, P.: Synthesis and Preliminary Structural and Binding Characterization of New Enantiopure Crown Ethers Containing an Alkyl Diarylphosphinate or a Proton-Ionizable Diarylphosphinic Acid Unit, *Eur. J. Org. Chem.* **2012**, 3396**–**3407.
7. Kormos, A.; Móczár, I.; Pál, D.; Baranyai, P.; **Kupai, J.**; Tóth, K.; Huszthy, P.: Synthesis and enantiomeric recognition studies of a novel 5,5-dioxophenothiazine-1,9 bis(thiourea) containing glucopyranosyl groups, *Tetrahedron:Asymmetry* **2013**, *24*, 62–65.
8. Németh, T.; Lévai, S.; Kormos, A.; **Kupai, J.**; Tóth, T.; Huszthy, P.: Preparation and Studies of Chiral Stationary Phases Containing Enantiopure Acridino-18-Crown-6 Ether Selectors, *Chirality* **2014**, *26*, 651–654.
9. Lévai, S.; Németh, T.; Fődi, T.; **Kupai, J.**; Tóth, T.; Huszthy, P.; Balogh, Gy. T.: Studies of a pyridino-18-crown-6 ether-based chiral stationary phase on the enantioseparation of biogenic chiral aralkylamines and α-amino acid esters by high-performance liquid chromatography, *J. Pharm. Biomed. Anal.* **2015**, *115*, 192–195.
10. Németh, T.; Lévai, S.; Fődi, T.; **Kupai, J.**; Túrós, Gy.; Tóth, T.; Huszthy, P.; Balogh, Gy. T.: A Novel Method for the Preparation of a Chiral Stationary Phase Containing an

Enantiopure Acridino-18-Crown-6 Ether Selector, *J. Chromatogr. Sci.* **2015**, *53*, 431–435.

11. **Kupai J.**; Rojik E.; Huszthy P.; Székely Gy.: Role of Chirality and Macroring in Imprinted Polymers with Enantiodiscriminative Power, *ACS Appl Mater Interfaces* **2015**, *7*, 9516–9525.
12. **Kupai, J.**; Kisszékelyi, P.; Rojik, E.; Dargó, G.; Hegedűs, L.; Bezzegh, D.; Maszler, P.; Szabó, L.; Németh, T.; Balogh, Gy. T.; Huszthy, P.: Synthesis and determination of p*K*a values of new enantiopure pyridino- and piperidino-18-crown-6 ethers, *Arkivoc*, **2016**, *iv*, 130–151.
13. Kókai, E.; Nagy, J.; Tóth, T.; **Kupai, J.**; Huszthy, P.; Simig, G.; Volk, B.: Convenient synthesis of 2-substituted 5,7-dihydro-6H-pyrrolo[2,3-d]pyrimidin-6-ones, *Monatshefte für Chemie*, **2016**, *147*, 767–773.
14. Fődi, T.; **Kupai, J.**; Túrós, G.; Németh, T.; Rojik, E.; Balogh, G. T., Huszthy, P.: Application of Flow Chemistry to Macrocyclization of Crown Ethers, *J. Flow Chem.*, **2016**, *6*, 297–301.
15. **Kupai, J.**; Razali, M.; Buyuktiryaki, S.; Kecili, R.; Szekely, G.: Long-term stability and resuability of molecularly imprinted polymers, *Polym. Chem.*, **2016**, *8*, 666–673.
16. Cseri, L.; Fődi, T.; **Kupai, J.**; Balogh, G. T.; Garforth, A.; Szekely, G.: Membrane-assisted catalysis in organic media, *Adv. Mater. Lett.* **2017**, *8*, 1094–1124.
17. Nyulasi, B.; Németh, A.; Porcs-Makkay, M.; **Kupai, J.**; Lukács, G.; Simig, G.; Volk, B.: Lithiation of 2-aryl-2-methyl-1,3-dioxolanes with PMDTA-complexed butyllithium, *Tetrahedron*, **2017**, *73*, 298–306.
18. Nagy, S.; Kozma, P.; Kisszékelyi, P.; Bezzegh, D.; Huszthy, P.; **Kupai, J.***: Synthesis of three new bifunctional glucose-thiourea organocatalysts and their application in asymmetric Michael addition, *Studia UBB Chemia* **2017**, *62*, 183–194.

*: corresponding author

19. Fődi, T.; Didaskalou, C.; **Kupai, J.**; Balogh, G. T.; Huszthy, P.; Szekely, G.: Nanofiltration-Enabled In Situ Solvent and Reagent Recycle for Sustainable Continuous-Flow Synthesis, *ChemSusChem* **2017**, *10*, 3435–3444.
20. Fődi, T.; Ignácz, G.; Decsi, B.; Béni, Z.; Túrós, G. I.; **Kupai, J.**; Balogh-Weiser, D.; Greiner, I.; Huszthy, P.; Balogh, G. T.: Biomimetic synthesis of drug metabolites in batch and continuous-flow reactors, *Chem. Eur. J.* **2018**, *24*, 9385–9392.
21. Kisszékelyi, P.; Nagy, S.; Tóth, B.; Zeller, B.; Hegedűs, L.; Mátravölgyi, B.; Grün, A.; Németh, T.; Huszthy, P.; **Kupai, J.***: Synthesis and recovery of pyridine- and piperidine-based camphorsulfonamide organocatalysts used for Michael addition reaction, *Per. Pol. Chem. Eng.* **2018**, *62*, 489–496.

*: corresponding author

22. Nagy S.; Kisszékelyi P.; **Kupai, J.***: Synthesis and application of thiosquaramides and their derivatives: a review, *Per. Pol. Chem. Eng.* **2018**, *62*, 467–475.

*: corresponding author

23. Nagy, S.; Fehér, Z.; Kisszékelyi, P.; Huszthy, P.; **Kupai, J.***: Cinchona derivatives as sustainable and recyclable homogeneous organocatalysts for aza-*Markovnikov* addition, *New J. Chem.* **2018**, *42*, 8596–8602.

*: corresponding author

24. Didaskalou, C.; **Kupai, J.***; Cseri, L.; Barabas, J.; Vass, E.; Holtzl, T.; Szekely, G.: Membrane-grafted asymmetric organocatalyst for an integrated synthesis-separation platform, *ACS Catal.* **2018**, *8*, 7430–7438.

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25. Kisszekelyi, P.; Alammar, A.; **Kupai, J.***; Huszthy, P.; Barabas, J.; Holtzl, T.; Szente, L.; Bawn, C.; Adams, R.; Szekely, G.: Asymmetric synthesis with cinchona-decorated cyclodextrin in a continuous-flow membrane reactor, *J. Catal.* **2019**, *371*, 255–261.
*: co-corresponding author
26. Nagy, S.; Dargó, G.; Kisszekelyi, P.; Fehér, Z.; Simon, A.; Barabás, J.; Höltzl, T.; Mátravölgyi, B.; Karpati, L.; Drahos, L.; Huszthy, P.; **Kupai, J.***: New enantiopure binaphthyl-cinchona thiosquaramides: synthesis and application for enantioselective organocatalysis, *New J. Chem.* **2019**, *43*, 5948–5959.
*: corresponding author
27. Nagy, S.; Fehér, Z.; Dargó, G.; Barabás, J.; Garádi, Z.; Mátravölgyi, B.; Kisszékelyi, P.; Dargó, G.; Huszthy, P.; Höltzl, T.; Balogh, G.T.; **Kupai, J.***: Comparison of Cinchona Catalysts Containing Ethyl or Vinyl or Ethynyl Group at Their Quinuclidine Ring. *Materials* **2019**, *12*, 3034. *: corresponding author
29. Kisszekelyi, P.; Hardian, R.; Vovusha, H.; Chen, B.; Zeng, X.; Schwingenschlogl, U.; **Kupai, J.***; Szekely G.: Selective Electrocatalytic Oxidation of Biomass-derived 5-Hydroxymethylfurfural to 2,5-Diformylfuran: From Mechanistic Investigations to Catalyst Recovery, *ChemSusChem* **2020**, *13*, 3127–3136.
*: corresponding author
30. Kisszékelyi, P.; Nagy, S., Fehér, Z., Huszthy, P.; **Kupai, J.***: Membrane-Supported Recovery of Homogeneous Organocatalysts: a Review, *Chemistry* **2020**, *2*, 742–758.
*: corresponding author
31. Nagy, S.; Fehér, Z.; Kárpáti, L.; Bagi, P.; Kisszékelyi, P.; Koczka, B.; Huszthy, P.; Pukánszky, B.; **Kupai, J.***: Synthesis and applications of cinchona squaramide-modified poly(glycidyl methacrylate) microspheres as recyclable polymer-grafted enantioselective organocatalysts, *Chem. Eur. J.* **2020**, 26, 13513–13522.
*: corresponding author
32. Kisszékelyi, P.; Nagy, S., Fehér, Z., Huszthy, P.; **Kupai, J.***: Membránszűréssel visszaforgatható homogén organokatalizátorok előállítása és alkalmazása, *Magy. Kém. Foly.* **2020**, *126*, 110–120.
*: corresponding author
33. Nagy, S., Kisszékelyi, P.; Dargó, D., Huszthy, P.; **Kupai, J.***: Új, cinkona alapú organokatalizátorok előállítása, alkalmazása és visszaforgatása, *Magy. Kém. Foly.* **2020**, *126*, 153–162.
*: corresponding author
34. Kisszékelyi, P.*; Fehér, Z.; Nagy, S.; Bagi, P.; Kozma, P.; Garádi, Z.; Dékány, M.; Huszthy, P.; Mátravölgyi, B.; **Kupai, J.***: Synthesis of C3-Symmetric Cinchona-Based Organocatalysts and Their Applications in Asymmetric Michael and Friedel–Crafts Reactions, *Symmetry* **2021**, *13*, 521. IF: 2.713 (2020)
*: corresponding author

Budapest, 6 September 2021