JMSJ 論文賞受賞者のことば

　JMSJ とは，日本数学会の出版する学術雑誌 Journal of the Mathematical Society of Japan の略称です．JMSJ 論文賞（The JMSJ Outstanding Paper Prize）は，授賞年前年の JMSJ に掲載された論文のうち特に優れたもの（3 篇以内）の著者に贈られる賞です．2018 年 JMSJ 論文賞は以下の 3 篇に贈られました．（所属は授賞時のものを掲載しています．）

著者：Jonathan Bennett 氏（University of Birmingham），Neal Bez 氏（埼玉大学），Chris Jeavons 氏（University of Birmingham），Nikolaos Pattakos（University of Birmingham）
論文題目： On sharp bilinear Strichartz estimates of Ozawa–Tsutsumi type, JMSJ, 69 (2017), 459–476.

受賞者のことば：

　We are proud and extremely honoured to receive this prize from the Journal of the Mathematical Society of Japan and we extend our sincerest gratitude to the members of the prize committee. News of the award came as a delightful surprise and gives us great encouragement to pursue challenging research goals in the future.

　Our paper is concerned with certain space-time estimates for solutions of the free Schrödinger equation, with focus on identifying the optimal constant along with a characterisation of the extremal initial data. Broadly speaking, space-time estimates for solutions of various types of PDE have had a profound impact on the development of the subject in the past half-century, a significant portion of which has taken place in Japan. The study of optimal forms of such estimates naturally arose as part of this growth and work by Ozawa–Tsutsumi from 1998 is one of the earliest, if not the earliest, papers containing results on optimal space-time estimates for the free Schrödinger equation. Since then a significant body of related work has emerged with papers by Kunze, Foschi and Hundertmark–Zharnitsky in particular propelling the topic forward in the early-to-mid 2000s. Optimal space-time estimates closely related to those obtained by Ozawa–Tsutsumi were established by Planchon–Vega and Carneiro, both in 2009, and interestingly all three approaches were based on substantially different ideas. One of the main contributions in our paper was to unify these estimates in a natural way by viewing them as particular cases of a one-

parameter family of optimal estimates and providing a streamlined proof. Additionally, our proof exposes an underlying heat-flow monotonicity phenomena whereby the difference between the two sides of the estimate is shown to be a monotone function as the initial data evolves under classical heat-flow, elucidating the fact that gaussian data are extremal.

We thank again the Mathematical Society of Japan and hope that it continues to foster progress in mathematics through its range of activities and awards.

Jonathan Bennett, Neal Bez, Chris Jeavons and Nikolaos Pattakos

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論文題目： Modules over quantized coordinate algebras and PBW-bases, JMSJ, 69 (2017), 1105－1156.

受賞者のことば：
　最近，石舞台古墳のそばでタイムスリップ（のマネを）して，不思議な感覚に包まれました．数学の研究においても，自分が歴史の一コマに立ち会っていることを感じるときには，似た気分になります．
　今回の受賞論文は，国場敦夫・尾角正人・山田泰彦 3 氏による 4 面体方程式と関連するある観察について，その内在的理由を量子座標環を用いて明らかにしたものです．私自身，近年は主として量子旗多様体に関する研究をしてきており，この論文のテーマはそれとは少し方向が異なりますが，これまでの研究で長年慣れ親しんできた道具立てが大いに役立ちました．その意味では近年の研究が報われたのだと思っています．今後も，このテーマの未来の歴史を見守りつつ，可能ならば私自身にもさらなる寄与ができればと思います．
「見れど飽かぬ吉野の河の常滑の絶ゆることなくまた還り見む　巻一（三十七）」

著者：前川　泰則　氏（Yasunori Maekawa，東北大学），Jonas Sauer 氏（Technische Universität Darmstadt）
論文題目： Maximal regularity of the time-periodic Stokes operator on unbounded and bounded domains, JMSJ, 69 (2017), 1403－1429.

受賞者のことば：
　この度 JMSJ 論文賞を賜り，大変光栄に存じますとともに深く感謝申し上げます．論文は Stokes 方程式の時間周期解の最大正則性評価に関するもので，この方面の研究に詳しい共著者の Jonas Sauer 氏にいろいろと教えてもらいながら仕上がった論文です．最近は流体力学の境界層や shear flow の安定性に関連した研究を行っていますが，形式的に見積もられた厚みを持つ境界層の構成や安定性の評価

等で行う作業は，異なる作用素のある種のスケールが釣り合った状況の解析となり，数学的には最大正則性評価を確立できるかという問題と関連します．まだ浅学の身ではありますが，この度の栄誉ある賞を励みにして今後とも研究に邁進していきたいと思います． （前川　泰則　氏）

The story of this paper began in the small town of Bad Boll in Germany, where Prof. Hieber and Prof. Kozono had organized a German-Japanese conference on fluid mechanics in the autumn of 2014. Prof. Maekawa was giving a lecture in this conference, and I was immediately impressed by his course. I had been thinking for a while about how to transfer the result of Prof. Kyed on time-periodic Navier–Stokes equations from the whole space to other spatial domains, and I felt that the isomorphism for spaces of solenoidal vector fields that Prof. Maekawa was presenting should be applicable not only for the stationary Stokes equations, but also in the time-periodic setting. Therefore I was very happy when he invited me to Tohoku University in the spring of 2015, and it was there that he explained to me in detail the isomorphism between the solenoidal space L_σ^p and $(n-1)$ copies of L^p that he had obtained together with Prof. Miura. We spend the rest of the week understanding how to put together the pieces of the puzzle in order to treat the problem in the half-space. By the time I was in the plane back to Europe, the main ideas were there. What followed were several weeks of increased effort to polish the results and to work out the impact that they had on the corresponding initial value problem. At times we were working literately around the clock, using the time shift between Japan and Germany to our advantage.

Thus I am very honored and humbled to hear that our ideas and efforts have led to an article that has now been awarded with "The 2018 JMSJ Outstanding Paper Prize" of the Mathematical Society of Japan. （Jonas Sauer 氏）