In order of importance, list of ten best papers of the candidate, highlighting the important discoveries/contributions described in them briefly (not to exceed 3000 words)

1) "A non-B DNA binding peptidomimetic channel alters cellular functions" R. Paul, D. Dutta, T. K. Mukhopadhyay, D. Müller, B. Lala, A. Datta, H. Schwalbe, **J. Dash***, *Nature Communications*, **2024**, *15*, article number 5275.

Prof. Dash and her group synthesized a thiazole-based DNA binding peptide mimic (TBP2) which exhibits the unique ability to form self-assembled nanostructures in lipid microenvironments and effectively transport K^+ and Na^+ ions across model lipid bilayer membranes. Moreover, TBP2 inhibits cancer cell growth by modulating intracellular ion concentrations and G-quadruplex-mediated transcriptional regulation of oncogenes.

2) "Expanding the Toolbox of Target Directed Bio-Orthogonal Synthesis: In Situ Direct Macrocyclization by DNA Templates" R. Chaudhuri, P.Thumpati, **J. Dash***, *Angewandte Chemie International Edition* **2023**, *62*, e202215245. (Front cover, appeared in Hot Topic: Bioorthogonal Chemistry).

This study presents the first example of using non-canonical DNAs as templates to direct bioorthogonal macrocyclization. The size complementarity between the macrocyclic core and the G-quartet of a G-quadruplex DNA is crucial in promoting macrocyclization instead of oligomerization. In cellulo macrocyclization has also been established leading to a peptidomimetic macrocycle with promising therapeutic properties.

3) "Target Directed Azide-Alkyne Cycloaddition for Assembling HIV-1 TAR RNA Binding Ligands" R. Paul, D. Dutta, R. Paul, **J. Dash***, *Angewandte Chemie International Edition* **2020**, *59*, 12407-12411.

Researchers have developed a technique to selectively target and inhibit the interaction between HIV-1 TAR RNA and the Tat protein, which is essential for viral replication. They used a biotin-tagged TAR RNA to assemble its own ligands from a pool of reactive azide and alkyne building blocks. The hit triazole-linked thiazole peptidomimetic products bind specifically to TAR RNA and inhibit Tat-TAR interactions, potentially leading to the development of potent antiviral agents.

4) "In situ Formation of Transcriptional Modulators using Non-canonical DNA i-Motifs" P. Saha, D. Panda, D. Müller, A. Maity, H. Schwalbe, **J. Dash***, *Chemical Science* **2020**, *11*, 2058-2067 (inside back cover).

Non-canonical DNA i-motifs and G-quadruplexes are proposed as switches for regulating proto-oncogenes. However, the therapeutic potential of i-motifs is not well explored due to their structural complexity. In this study, Prof. dash and group used a target guided synthetic approach involving cycloaddition to generate specific ligands for i-motifs, which selectively promote their formation and regulate gene expression (c-MYC and BCl-2) in vitro. This strategy holds promise for developing i-motif specific ligands for therapeutic intervention.

5) "Ionophore constructed from non-covalent assembly of a G-quadruplex and liponucleoside transports K^+-ion across biological membranes" M. Debnath, S. Chakraborty, Y. P. Kumar, R. Chaudhuri, B. Jana, **J. Dash***, *Nature Communications*, **2020**, *11*, Article number: 469.

Prof. Dash and team have developed a new artificial ion transporter using a telomeric DNA G-quadruplex (h-TELO) and a lipophilic guanosine (MG). The ion transporter demonstrates selective transport of potassium ions and has the ability to transport K^+-ions across CHO and K-562 cell membranes. This discovery could pave the way for the development of targeted and effective DNA-based transporters for medical applications.

6) "Cell Penetrating Thiazole Peptides Inhibit c-MYC Expression via Site-Specific Targeting of c-MYC G-quadruplex" D. Dutta, M. Debnath, D. Müller, R. Paul, T. Das, I. Bessi, H. Schwalbe, **J. Dash*** *Nucleic Acids Research* **2018**, *46*, 5355-5365.

This study focuses on the design and synthesis of a thiazole peptide (TH3) that specifically interacts with and stabilizes the c-MYC G-quadruplex structure. Biophysical analysis shows that TH3 selectively binds to the c-MYC G-quadruplex, and further experiments in cellular systems demonstrate that it downregulates c-MYC expression in cancer cells, inducing cell cycle arrest and apoptosis.

7) "Preferential targeting of i-motifs and G-quadruplexes by small molecules", M. Debnath, S. Ghosh, A. Chauhan, R. Paul, K. Bhattacharyya, **J. Dash***, *Chemical Science* **2017**, *8*, 7448-7456.

Prof. Dash and group have developed two peptidomimetic ligands, PBP1 and PBP2, that selectively target i-motifs and G-quadruplexes in nucleic acids. These ligands can induce the formation of these secondary structures from single-stranded DNA. Furthermore, they have demonstrated that PBP1 upregulates the expression of the BCL-2 gene while PBP2 downregulates its expression in cancer cells.

8) "Target guided synthesis using DNA nano-templates for selectively assembling a G-quadruplex binding c-MYC inhibitor", D. Panda, P. Saha, T. Das, **J. Dash***, *Nature communications*, **2017**, *8*, 16103.

Target Guided Synthesis approaches using DNA nano-templates are effective in identifying potent small molecules for biological targets. In this study, Prof. Dash demonstrates the use of DNA nano-templates to promote Huisgen cycloaddition, resulting in the formation of 1,4-substituted triazole products that can inhibit c-MYC expression. This innovative approach has potential for generating target-selective ligands for drug discovery.

9) "Synthesis of carbazole alkaloids by ring-closing metathesis and ring rearrangement–aromatization", K. Dhara, T. Mandal. J. Das, **J. Dash*** *Angewandte Chemie International Edition*, **2015**, *54*, 15831-15835.

Prof. Dash and group have developed a new method for assembling carbazole alkaloids using ring-closing metathesis and ring-rearrangement-aromatization. They found that allyl Grignard addition to isatin derivatives allowed for the creation of 2,2-diallyl 3-oxindole derivatives, which could then undergo a series of reactions to produce carbazole derivatives. This streamlined process was successfully used to synthesize various carbazole alkaloids.

10) "A DNA-inspired synthetic ion channel based on G−C base pairing", R. N. Das, Y. P. Kumar, O. M. Schütte, C. Steinem,* **J. Dash***, *Journal of the American Chemical Society*, **2015**, *137*, 34–37.

In this study, Dr Dash and her team synthesized a new dinucleoside containing guanosine and cytidine at the end groups that forms large channels in the membrane and selectively allows potassium ions to pass through the membrane. Various microscopic techniques and spectroscopic studies show that this dinucleoside can spontaneously associate through Watson–Crick canonical H-bonding and π–π stacking to form stable supramolecular structures.