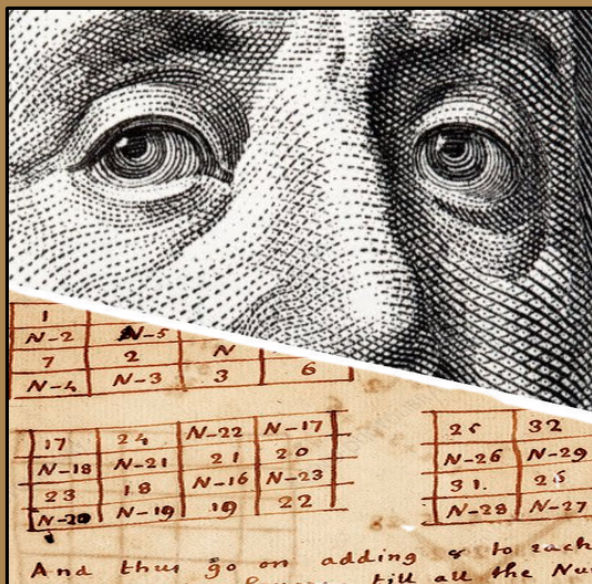**UCCS Department of Mathematics**

Math Colloquium Series

DR. JOHN LORCH
BALL STATE UNIVERSITY

DATE:
THURSDAY
APRIL 18, 2019

TIME:
12:30PM-1:30PM
(REFRESHMENTS AT 12:15PM)

LOCATION:
OSBORNE
ROOM #A327

Expanding Franklin's Magic Squares

In the mid 1730's Benjamin Franklin was a clerk in the Pennsylvania Assembly. As a boredom-reducing form of amusement during long sessions of the Assembly, Franklin constructed interesting semi-magic squares. One such square, along with a cryptic indication of its magic properties, is shown below.

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

			13	20			
14			51	46			19
	60					37	
		59			38		
			10	23		39	
						25	
50	63	2	15			34	
						32	

Franklin is known to have produced two such squares of order 8 (i.e., 8×8 arrays) and one square of order 16 with similar properties. In fact, semi-magic squares possessing the special properties exhibited in Franklin's squares exist in order $8k$, where k is any positive integer. In this presentation we review Franklin's magic squares, we identify magic properties that should be possessed by a Franklin square of order kp^3 where p is an odd prime, and we construct such squares.

For more information please contact the UCCS Math Department at
(719) 255-3311 http://www.uccs.edu/math