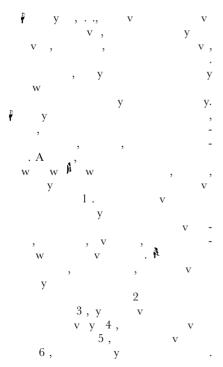
## Finding O Wa, hogh Pheno, \_e

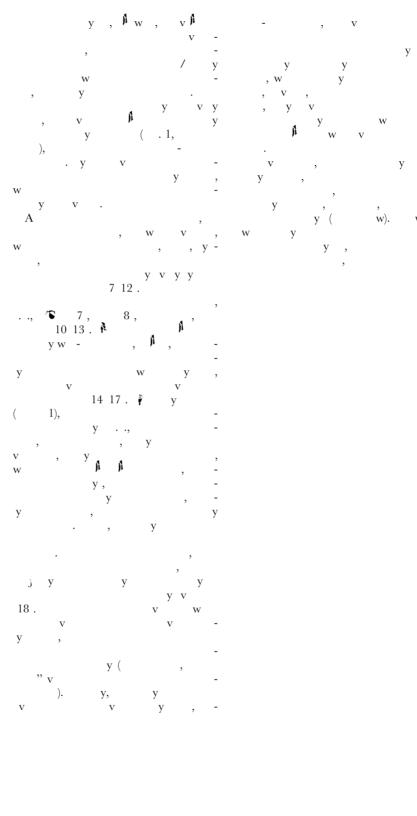
Andre R. Dean <sup>1\*</sup>, **6** anna E. Le i <sup>2</sup>, E. a bi ala<sup>3,4</sup>, Sal, a ore S. An aldo<sup>5</sup>, Michael A hib rner<sup>6</sup>, Jame P. Balhoff<sup>7</sup>, Da, id C. Blackbi rn<sup>8</sup>, bi di h A. Blake<sup>9</sup>, J. Gordon Bi rleigh<sup>10</sup>, Bui no Chane <sup>11</sup>, Lib rel D. Cooper<sup>12</sup>, Melanie Cib ro <sup>13</sup>, Sandor C b <sup>14</sup>, Hong **G** i <sup>15</sup>, Wa ila Dahob I <sup>16</sup>, Sandip Da <sup>17</sup>, T. Ale ander Dececchi <sup>16</sup>, Agne De ai <sup>11</sup>, **G** i Diogo <sup>18</sup>, Rober E. Dui in k <sup>19</sup>, Michel Di mon ier<sup>20</sup>, Nico M. Fran <sup>5</sup>, Frank Friedrich<sup>21</sup>, George V. Gkoi o <sup>22</sup>, Meli a Haendel <sup>23</sup>, bi ke J. Harmon <sup>24</sup>, Terr F. Ha amiu <sup>25</sup>, Yongoi n He <sup>26</sup>, Hea her M. Hine <sup>1</sup>, Ni ar Ibrahim <sup>27</sup>, Lib ra M. Jack on <sup>16</sup>, Pankaj Jai al <sup>12</sup>, Chri ina Jame -Zorn <sup>28</sup>, Seba ian Köhler <sup>29</sup>, **G** illo me Lecoin re <sup>11</sup>, Hilmar Lapp <sup>7</sup>, Carol n J. La rence <sup>30</sup>, Nicola Le No, ere <sup>31</sup>, John G. bi ndberg <sup>32</sup>, Jame Macklin <sup>33</sup>, bi in R. Ma <sup>34</sup>, Pe er E. Midford <sup>35</sup>, I an Miko <sup>1</sup>, Chri opher J. Mi ngall <sup>2</sup>, Anika Oellrich <sup>36</sup>, Da, id Ou mi-**G** herland <sup>36</sup>, Helen Parkin on <sup>36</sup>, Mar n J. Ram re <sup>37</sup>, S efan Rich er <sup>38</sup>, Pe er N. Robin on <sup>39</sup>, Alan Bi enberg <sup>40</sup>, Ka ja S. Scho I <sup>41</sup>, Erik Segerdell <sup>42</sup>, Ka ja C. Sel mann <sup>43</sup>, Michael J. Sharke <sup>44</sup>, Aaron D. Smi h <sup>45</sup>, Barr Smi h <sup>46</sup>, Chel ea D. Spech <sup>47</sup>, R. Bi rke Sop ire <sup>48</sup>, Rober W. Thacker <sup>49</sup>, Anne The en <sup>50</sup>, Jo e Fernande -Triana <sup>51</sup>, Mae no Vihinen <sup>52</sup>, Pe er D. Vi e <sup>53</sup>, Lar Vog <sup>54</sup>, Chri ine E. Wall <sup>55</sup>, Ramona L. Wall <sup>56</sup>, Mon e We erfeld <sup>57</sup>, Rober A. Whar on <sup>58</sup>, Chri ian S. Wirkner <sup>38</sup>, Jame B. Woolle <sup>58</sup>, Ma he J. Yoder <sup>59</sup>, Aaron M. Zorn <sup>28</sup>, Pe la M. Mabee <sup>16</sup>

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ac: Despite a large and Ab multifaceted effort to understand the vast landscape of phenotypic data, their current form inhibits productive data analysis. The lack of a community-wide, consensusbased, human- and machine-interpretable language for describing phenotypes and their genomic and environmental contexts is perhaps the most pressing scientific bottleneck to integration across many key fields in biology, including genomics, systems biology, development, medicine, evolution, ecology, and systematics. Here we survey the current phenomics landscape, including data resources and handling, and the progress that has been made to accurately capture relevant data descriptions for phenotypes. We present an example of the kind of integration across domains that computable phenotypes would enable, and we call upon the broader biology community, publishers, and relevant funding agencies to support efforts to surmount today's data barriers and facilitate analytical reproducibility.

## In rod c ion







## Achie, ing Da a In egra ion

